Just prior to when the blight hit in 1904, there were an estimated 9 billion chestnut sprouts in the eastern United States, from Maine to Georgia; 25% of some forest canopies were composed of mature American chestnuts.

By 1950, the species was all but eradicated from the forest ecosystems.

Utilizing the genetic research of successful corn and soybean breeders, the concept of TACF's backcross breeding began in 1989, working to transfer the resistance of the Chinese chestnut into the American chestnut, hoping to achieve a diverse lot of progeny with blight resistance of the Asiatic species, growth and timber form of the American chestnut species, and enough diversity for the population to survive in the eastern United States in perpetuity.

THE PATH TO MOST RESISTANCE

(Based on three genes for resistance)

PARENTS 100% Chinese chestnut 100% American chestnut Х (Blight resistant/orchard type) (Blight susceptible/timber type) Degree of Resistance Resistant American Characteristics & Average % American Parentage Fully to No Intermediate Resistant 50% 100% (F₁) First Generation Hybrid 75% Backcross: American $x F_1 = BC_1$ 87.5% 12.5% 0% 87.5% Backcross: American x $BC_1 = BC_2$ 87.5% 12.5% 0% 87.5% 93.75% Backcross: American x $BC_2 = BC_3$ 12.5% 0% 93.75% Intercross: $BC_3 \times BC_3 = BC_3F_2$ 34.4% 64.0% 1.6% 0% 93.75% Intercross: $BC_3F_2 \times BC_3F_2 = BC_3F_3$ 0% 100%?*

Each generation of trees is inoculated with blight fungus and selected for resistance and American characteristics. Each backcross generation requires a minimum of 5 years to complete. The F₁ generation can be completed in 3 years. For an explanation of terms please refer to the Quick Guide to Terminology on page 9.

Get Involved with PA-TACF

Help us make NJ-TACF happen!

This year in New Jersey, we will be having plantings in Morris County and in Stokes State Forest.

As for pollinations, we will be having activities in High Point State Park, Harthshorne Woods Park, the Wanaque Reservoir, and possibly elsewhere! That depends on you!

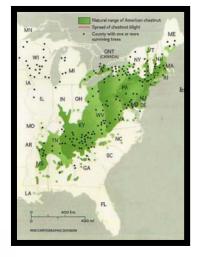
We'll need your help locating new trees and new planting locations, as well as helping to maintain current plantings

We need assistance in various activities almost year-round – there's always something that can be done!

 $Chest nut\ Growers\ Homepage:\ \underline{http://chest nut.cas.psu.edu}$

→ Join our mailing lists!

PA-TACF's Homepage: http://www.patacf.org



A Quick Guide to Chestnut Breeding Terminology

American x Chinese	=	F۱
$F_1 \times F_1$	=	F_2
$F_2 \times F_2$	=	F ₃
F ₁ x American	=	BC_1
(also known as	ВС	(F_1)
$BC_1 \times BC_1$	=	BC ₁ -F ₂
BC_1 - $F_2 \times BC_1$ - F_2	=	BC_1-F_3
BC ₁ x American	=	BC ₂
$BC_2 \times BC_2$	=	BC ₂ -F ₂
BC ₂ -F ₂ x BC ₂ -F ₂	=	BC ₂ -F ₃
BC ₂ x American	=	BC ₃
BC ₃ x BC ₃	=	BC ₃ -F ₂
BC_3 - $F_2 \times BC_3$ - F_2	=	BC_3-F_3

BC (often written as B) indicates the offspring of a backcross, the breeding of a pure American chestnut with a tree that is a genetic mixture of blight resistant and pure American stock.

F indicates the offspring of an intercross, the breeding of two genetically "pure" trees or two trees of the same generation that are already a genetic mixture of blight resistant and pure American stock. Lowered numbers indicate the number of times a breeding procedure has occurred in a tree's lineage.

CONTACT INFORMATION:

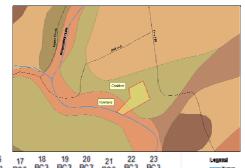
Leffel Chestnut Center Penn State University 206 Forest Resources Lab University Park, PA 16802

Phone: 814-863-7192 E-mail: sara@psu.edu

^{*} This precentage of highly resistance trees is a hope of The American Chestnut Foundation. It is based upon certain scientific assumptions and cannot be proven at this time.

Chestnut Orchard Tour Saturday, March 11, 2006

Figure 1. NJCF's Bruce property and map of chestnut orchard. The planting is located in the southwestern tail of the Bruce property. The Chalfont series consists of deep and very deep, somewhat poorly drained soils.



			BC3	2 Am	3 BC3	4 BC3	5 BC3	6 BC3	7 BC3	8 BC 3	9 BC3				13 BC3		15 BC3	16 Am	17 BC3	18 BC3	19 BC3	20 BC3	21 BC3	22 BC3	23 BC3
+, x – dea	d		7	7	7	7	7	7	×	7	7	7	×	×	×	7	7	+	·	×	+	×	7	×	×
A			46 BC3	45 BC3	44 BC3	43 BC3	42 BC3	41 BC3	40 Ch	39 BC 3	38 BC3	37 BC3	36 BC3	35 BC3	34 BC3	33 BC3	32 BC3	31 BC3	30 BC3	29 BC3	28 BC3	27 BC3	26 BC3	25 BC3	24 BC3
			7	7	7	7	7	×	7	7	7	7	×	7	×		×		×	×	×	+	×	×	×
V			47 BC3	48 BC3	49 BC3	50 BC3	51 BC3	52 BC3	53 BC3	54 BC 3	55 BC3	56 BÇ3	57 BC3	58 Am	59 BC3	60 Ch	61 Am	62 BC 3	63 BC3	64 BC3	65 BC3	66 BC3	67 BC3	68 BC3	69 BC3
North			*	7	7	7	+	7	×	7	7	7	+	7		×	×	7	7	7	7	×	7	×	7
		92.1 BC3	92 BC3	91 BC3	90 BC3	89 BC3	88 BC3	87 BC3	86 BC3	85 BC 3	84 BC3	83 BC3	82 BC3	BC3	80 Am	79 BC3	78 BC3	77 BC 3	76 BC3	75 BC3	74 BC3	73 Ch	72 BC3	71 BC3	70 BC3
		7	7	7	7	7	7	7	7	Ť	+	×	7	×	7	×	×	×	+	+	*	×	7	7	*
	93.2 BC3	93.1 BC3	93 BC3	94 BC3	95 BC3	96 BC3	97 BC3	98 BC3	99 BC3	100 BC 3	101 BC3	102 BC3	103 BC3	104 BC3	105 BC3	106 BC3	107 BC3	108 BC 3	109 BC3	110 BC3	111 BC3	112 F1	113 BC3	114 BC3	115 BC3
	7	7	*	7	7	7	7	×	×	7	7	7	7	×	×	×	×	X	×	+	×	7	×	+	+
	140 F1	139 BC3	138 BC3	137 BC3	136 Ch	135 BC3	134 BC3	133 BC3	132 BC3	131 Am	130 BC3	129 BC3	128 BC3	127 BC3	126 BC3	125 F1	124 BC3	123 BC 3	122 Am	121 F1	120 BC3	119 Am	118 BC3	117 BC3	116 BC3
	7	×	×	×	×	×	×	×	×	7	×	7	+	×	×	×	×	×	7	×	7	+	×	×	×

The Bruce and Jarboe properties were the first official plantings of material by the Pennsylvania Chapter of the American Chestnut Foundation (PA-TACF). Through the donation of lands in the Stockton area by the New Jersey Conservation Foundation (NJCF), PA-TACF planted the Bruce BC3 orchard in 2003, planted with Graves source of resistance

T	0	Disastad	Alive	%	Avg. Ht	Avg. Ht
Type	Cross	Planted	(2004)	Survival	(ft.) 2003	(ft.) 2004
Am	FaYo x opAm	8	4	50%	0.95	2.79
BC3	SkWe-1 x GL239	25	10	40%	1.15	2.73
BC3	LuWe-1 x GL98	41	16	39%	1.19	3.34
BC3	PRSo x GL356	56	25	44%	0.55	1.88
BC3	HYWa x GL356	4	1	25%	0.33	0.50
Ch	KWDa x opCh	5	2	40%	1.54	2.00
F1	Br99-7-081 x BuMD	4	1	25%	0.88	5.83
		143	59	41%	0.88	2.54

material. The next year, the Jarboe property

Figure 2. Survival and average height for the Bruce BC3 chestnut orchard.

was secured by NJCF, and test plantings of advanced hybrid material were place on the land to test the suitability of the site for future use as a 5th generation orchard location.

Within the next two years, PA-TACF hopes to start producing 5th generation seed from its orchards derived from the Graves source of resistance; we hope to plant this on the NJCF Jarboe property.

We have the land and fencing mostly secured, but we need help from volunteers in the area who can help maintain the orchard. Maintenance entails planting, mowing, weeding, possible herbicide application, and general tree care. With your help joined with that of our current experienced volunteer work force in eastern Pennsylvania and New Jersey, we hope to eventually establish a 5-acre area with an estimated 10,000 trees.

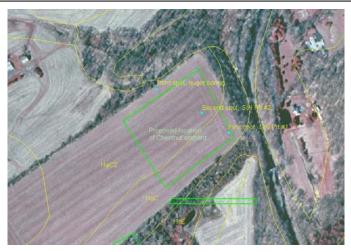


Figure 3. NJCF's Jarboe property and outline of proposed BC3F2 orchard location.