

(Editor's Note: Dr. Norman E. Borlaug, 1970 Nobel laureate for crop breeding research and Honorary Board Director of The American Chestnut Foundation, provides commentary on the TACF Breeding Program Review in a letter to executive director Marshal Case.)

January 25th, 2000

Mr. Marshal Case
The American Chestnut Foundation
PO Box 4044
Bennington, VT 05201-4044

Dear Mr. Case:

...I have been fascinated by the progress that has been made in the incorporation of blight resistance into the American Chestnut. All who have collaborated in this adventure, are to be congratulated for the progress that has been achieved.

I can fully appreciate the importance of this project, for I was a young forester working at the Northeastern Forest Experiment Station in 1936 at the Hopkins Experimental Forest at Williamstown, Massachusetts when the last of the big chestnuts were being killed by the blight. I was too young and inexperienced at that time, to really understand its implications. But as I continued my studies, and especially when I studied forest pathology and later plant pathology, I came to realize what a disaster I had witnessed in those early years.

After shifting from my forestry career to genetics and plant pathology, I have spent most of my career breeding of wheat, for high grain yield, broad ecological adaptation and resistance to diseases-especially against the rust fungi (three species of *Puccinia*). Having worked in innumerable countries around the world, I have come to appreciate the great genetic variation in pathogens that attack our crops and forest trees. For that rea-



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CHESTNUT BLOSSOMS

son, I am especially fascinated by the work you are doing.

I would like to make a few comments on the TACF Breeding Program Review that was done in August 12 to 15, 1999. I believe this is an excellent review and I want to congratulate the Committee who made this study and published the report. I do want to add a couple of comments, however, which I hope might be helpful.

Based on my long experience in back-crossing to control various diseases of wheat, while at the same time trying to improve grain yield and agronomic characters, I have come to realize that by growing a large population of F_1 plants of the second back-cross (BC_2), and selecting vigorously in the progeny for the morphologic phenotype of the recurrent commercial parent with seedlings with resistance to the disease you are breeding for, you can skew the selection more rapidly back towards the morphologic phenotype of the recurrent parent than if it is done at random, in which case you will probably need to use BC_3 or BC_4 .

If this procedure is followed, and if a large number of F_1 seeds of the second back-cross are used, I think that you can greatly save on the land required for "out-plantings" and at the same time make more rapid progress in obtaining good blight resistance in forest phenotypes similar to those of the native American Chestnut. If this procedure is followed in the BC_2 , rather than carried on to the BC_3 and BC_4 , a large percentage of those seedlings in the last back-cross (BC_2) will be within the acceptable morphologic traits of the native American Chestnut.

I would urge that you inoculate aggressively all segregating populations with *Endothia parasitica* inoculum taken from infected sprouts taken from as many different parts of the range of the American Chestnut as possible.

If your breeding program is using more than one species as a source of resistance to the blight organism, I suggest you attempt to make a few crosses between the different F_1 single crosses.

The second point which I would like to make, once you have a few outstanding seedlings identified in the second back-cross (BC_2) with good resistance to *Endothia* in acceptable morphologic makeup, I would suggest that some vegetative cuttings or clones be tested for their scope of resistance in the several areas of the original home of the Chestnut blight pathogens, namely China or Korea.

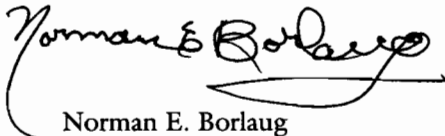
I feel quite confident if a concerted effort is made that satisfactory arrangements can be made for such testing in the People's Republic of

China, where you are likely to have good collaboration. I am sure that through the International Union of Forest Research Organizations (IUFRO), such arrangements can be made.

If you encounter unmanageable problems in making arrangements for such testing, perhaps I can serve as an intermediary, since I have been working in cereal production and disease problems in the People's Republic of China for more than 25 years.

With best wishes for continued success on this very worthy program — the TACF Breeding Program for incorporating chestnut blight resistance into the American Chestnut — I remain,

Sincerely,

A handwritten signature in cursive script that reads "Norman E. Borlaug". The signature is written in black ink and is positioned above the printed name.

Norman E. Borlaug