Several different hybrids were treated and developed the same type of injury. In most cases untreated seedlings grown adjacent to treated seedlings developed normally until the third leaf had elongated. Succeeding leaves developed typical symptoms of TCA injury with fusing of the leaves and curtailment of growth. Apparently the material was not transported through the roots to the growing point.

Soaking the seed in 1% TCA solution followed by drying on filter paper results as exposing it to the vapors of TCA, acetic acid vapors, and heat treatment all produced similar results. The question arose as to whether the TCA in the soil was entering the seed or whether it was adsorbed on the surface of the seed coat. Muller and numerer have previously shown that the 2,4-D from volatile esters is apparently adsorbed on the seed coat and does not enter the dry seed before germination. One portion of seed previously treated with 60% sodium TCA vapors was washed in running tap water for 30 minutes, and with another portion the seed coat was removed before planting in sand in the greenhouse. Both these lots developed seedlings that were normal and continued growing normally while treated seedlings upon germination. Under more adverse field conditions the TCA absorbed by the developing seedling often kills the seedling before it has an opportunity to emerge.

**Fig. 1. Seedlings from seed treated with vapors of TCA in foreground and seedlings from untreated seed in background. Seedlings 6 days old.**

Primary root and seminal roots developed normally. The mesocotyl appeared to elongate normally and the coleoptile emerged through the soil normally. However, the coleoptile usually continued to elongate and had the tendency to become enlarged and thickened. The first two or three leaves would usually break through the coleoptile but were fused and failed to unroll. Elongation of subsequent leaves was prevented, resulting in the growing point becoming enlarged and deformed. Dowling recently reported a significant amount of heterosis in the F1 generation of intraspecific crosses of cotton. He also showed the possibility of utilizing natural crosses of producing commercial hybrid cotton seed. 

**HETEROSIS AND COMBINING ABILITY IN UPLAND COTTON**

There is considerable interest among breeders at the present time regarding the possibility of producing hybrid cotton seed on a commercial scale. Kime and Tilley (1) and Simpson recently reported a significant amount of heterosis in the F1 generation of intraspecific crosses of cotton. He also showed the possibility of utilizing natural crosses of producing commercial hybrid cotton seed. M. J. Josephson, Agronomy, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Ky.