# INHERITANCE OF FOLIAGE VARIEGATION IN VARIEGATED ENGLISH ELM

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Inheritance of foliage variegation in variegated English elm, *Ulmus procera argenteo-variegata* (West.) Rehd., was observed on seedlings grown from seed of a single parent tree. Eighteen seedlings were obtained from an undetermined number of seeds which were planted May 22, 1940. Nine of the seedlings developed variegated foliage, while the remaining nine seedlings developed normal green foliage. Variegation began to appear on the first unfolding leaves when they were about ½ inch long. It increased in amount and in intensity on new leaves as they expanded during the growing season.

Variegation appeared as white to light green spots and stripes—a mosaic arrangement of green and white tissues—interspersed in the normal green tissues, fig. 1. White areas occurred where green pigment was absent in both the palisade cells and the spongy mesophyl. These white areas were visible on both the upper and lower surfaces of the leaves. Light green areas occurred where green pigment was present in the spongy mesophyl but was absent in the palisade cells. These light green areas were visible only on the upper surfaces of the leaves, except when the leaves were observed against a background of bright light.

The amount of variegation varied from a few white to light green areas on one or a few leaves of individual seedlings to numerous white to light green areas on many leaves of other seedlings. Variegation of the seedlings which had an abundance of white to light green areas, fig. 2, was similar in pattern and intensity to that of the parent plant, fig. 1.

Several investigators have reported that color abnormalities in the foliage of several plants are heritable. Emerson (2), studying blotch leaf of maize, and Burkholder and Miller (1), studying pseudo-mosiac of beans, found that these abnormalities are inherited as recessive factors. Parker (3) found that yellow-spot in beans is inherited as a single Mendelian factor and behaves as a simple dominant. Parker (4), Thompson (5), and Whitaker (6), studying certain foliage variegations in beans and lettuce, found that these abnormalities, due to chlorophyl deficiencies, were the result of cytoplasmic variation and that they could be transmitted only by a female parent—the parent contributing cytoplasm to the seed.

Because of the time required—several to many years would have to elapse before trees grown from seed would themselves produce seed—it has not been possible to analyse the method of inheritance by which variegation is transmitted by English elm. Because of the small number of seedlings observed, the apparent 1:1 ratio noted probably has no significance. From the studies cited above, that have been made with rapidly reproducing plants, it may be supposed, however, that variegation is transmitted by English elm as a cytoplasmic variation.

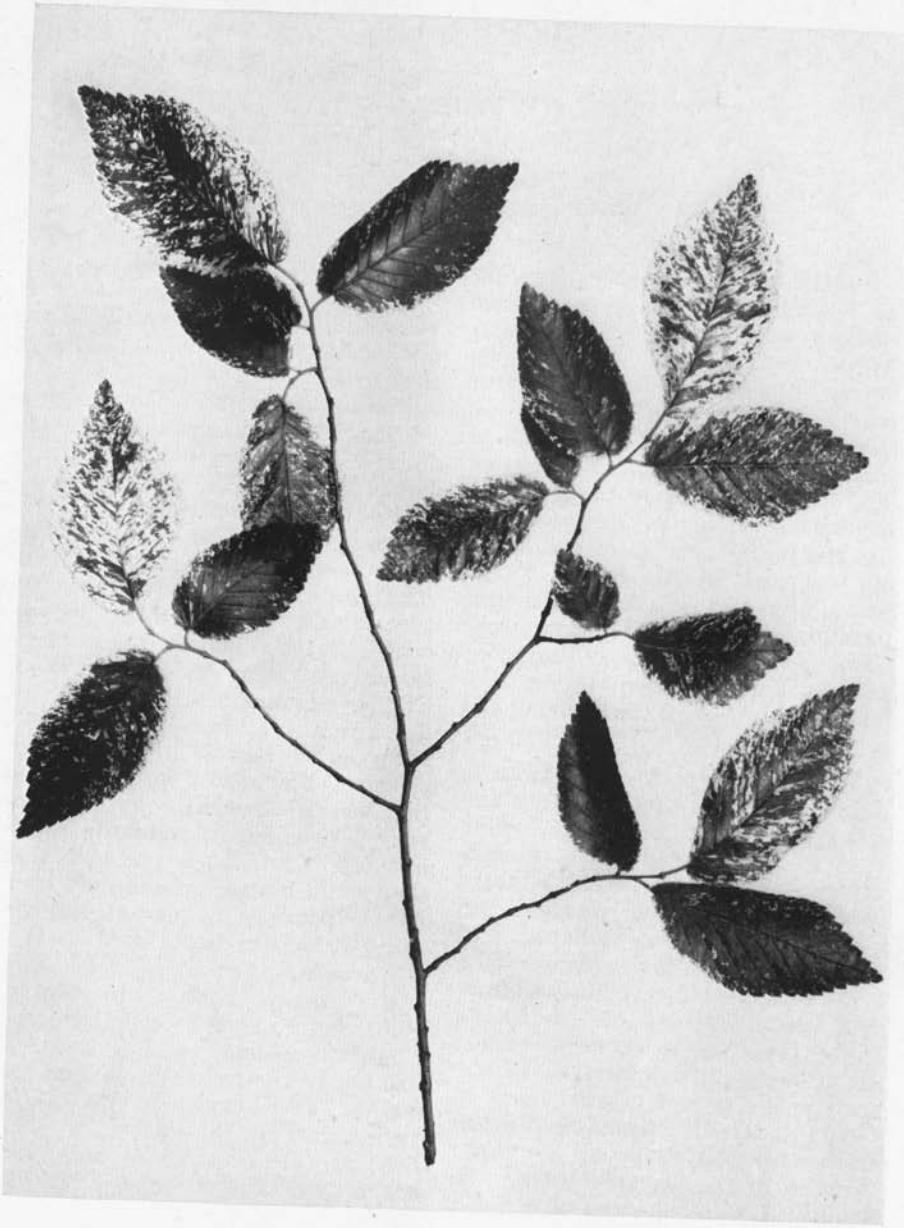

FIG. 1.—Variegated foliage of the parent tree showing the mosaic or blotched arrangement of the white and light green areas in the leaves. The amount or intensity of variegation varies greatly on different leaves of a single twig.

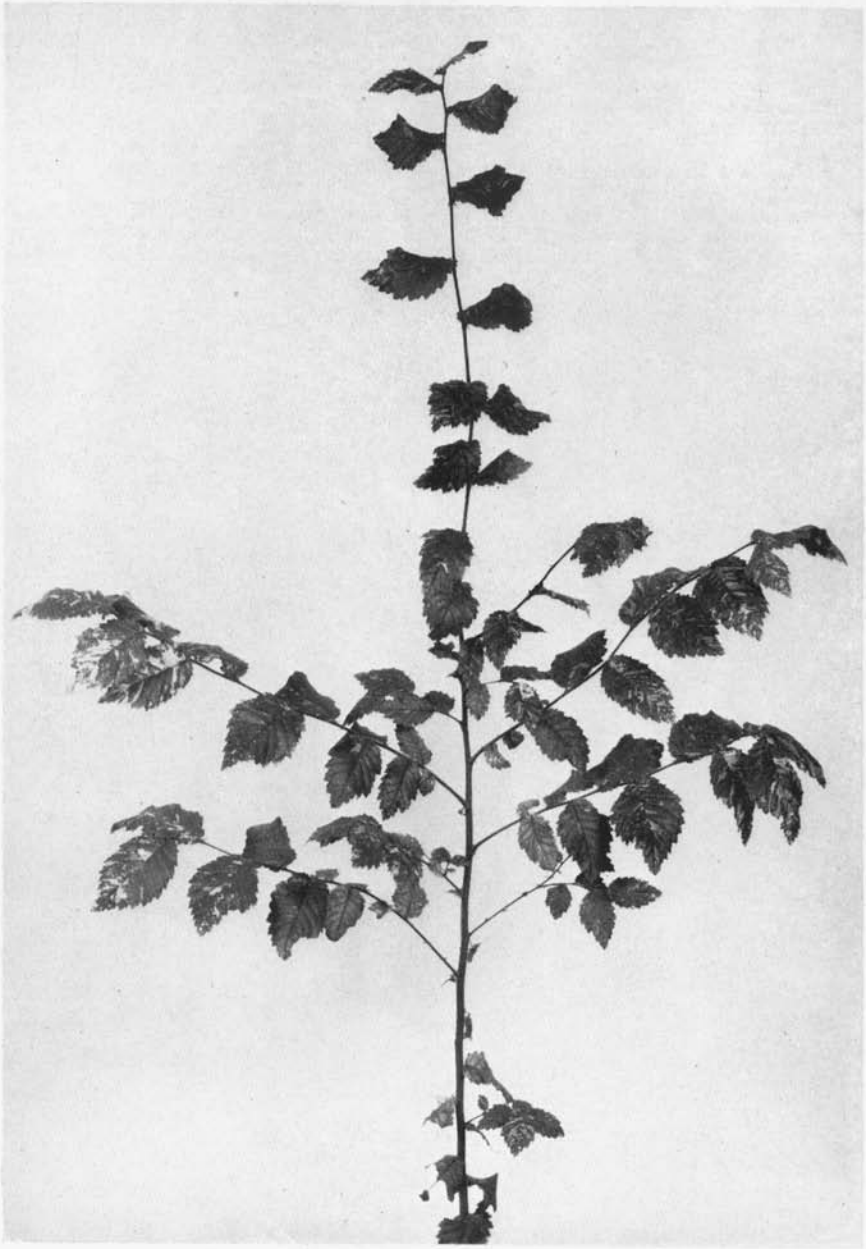

FIG. 2.—Variegated seeding showing variegation similar in pattern and intensity to that of the parent plant.

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