Abstract: *Metasequoia* Miki is a deciduous conifer with a highly restricted natural distribution in central China. It is a riparian species that thrives under conditions of abundant growing season moisture availability, although as is shown by its distribution in cultivation, it is capable of sustained growth under drier conditions as well. Whereas the variability of climate across its natural range is minute, under cultivation it grows across a gradient of 16.3°C of mean annual temperature and 2360 mm of mean annual precipitation. No cultivated *Metasequoia glyptostroboides* Hu et Cheng are known to exist without supplemental water in areas that receive less than ca. 500 mm of mean annual precipitation. *Metasequoia glyptostroboides* grows tall quickly and is capable of obtaining stem lengths in excess of 30 m in less than 50 years. Based on measurements of the trees from its natural range, maximum height may be just over 50 m. Analysis of growth performance of *M. glyptostroboides* through time indicates that trees from different seedlots grown in common garden experiments remain static in their relative growth.
rates through time; trees that grew quickly from the outset continued to outpace slower growing trees eight years later. A mixture of environmental factors may alter *M. glyptostroboides* growth form. Most notably, shrubby varieties are known from a mixture of cold climates, but are not always found in extremely cold areas.

**Key words:** cultivar, climate, dawn redwood, geographic range, growth rate.

1. **INTRODUCTION**

*Metasequoia glyptostroboides* Hu et Cheng, also called dawn redwood, or water-fir (Shui-sha-ba) is a rare deciduous taxodioid conifer of the family Cupressaceae. It is the single species in the genus. Its present natural range is limited to small, highly disturbed areas of western Hubei, northern Hunan and eastern Sichuan provinces in central China (Chu & Cooper, 1950; Fu & Jin, 1992). *Metasequoia* Miki was known initially from fossil material (e.g., Miki, 1941) and was widely distributed across many different habitats as early as the Late Cretaceous period (Yang & Jin, 2000; LePage *et al.*, this volume; Meyer, this volume; Momohara, this volume). It was not until 1948 that extant *M. glyptostroboides* was described in the scientific literature as a new species (Hu & Cheng, 1948) and thus, earned the title of “living fossil”.

Soon after the formal description of *M. glyptostroboides* as a new species, ecological studies were conducted on the main population of *M. glyptostroboides* (Chu & Cooper, 1950; Gressitt, 1953). This early research brought several issues to light: (1) The natural habitat of *M. glyptostroboides* was heavily impacted by human activity; (2) the distribution of many of the trees in the valley may be the result of transplantation by humans; and (3) remaining stands of *M. glyptostroboides* were highly fragmented and likely to bear the legacy of human land use and land change. Seed was collected from several populations in China and these were distributed worldwide in an effort to prevent extinction of the species (see Merrill, 1948; Kuser, 1999; Ma, 2003). This effort proved successful. Seedlings from the initial seed lot were planted throughout the world and today, trees are growing in botanical gardens and arboreta on every continent except Antarctica (see Satoh, 1999). In fact, this unintended experiment has revealed a wide range in tree morphology and a striking dichotomy between the environmental conditions of its current natural range and the environmental conditions the tree is capable of tolerating when cultivated.

The growth of *M. glyptostroboides* has been well studied from many different perspectives (e.g., ecological, genetic, horticultural, etc.). In light of the highly disturbed nature of native *M. glyptostroboides* stands, these data become extremely important in understanding the growth and ecology of a plant