M. Grandiflora in the winter of '77

by Dick Figlar

Much has been written over the years concerning the hardiness of *Magnolia grandiflora* north of its natural range. Facts have been partially documented regarding the extreme low temperatures that various *M. grandiflora* selections have endured, i.e., Gossler on 'Samuel Sommer', 'Victoria' and others. However, relatively little definitive climatic data has been correlated against *M. grandiflora's* ability to succeed in such specific climates.

The winter of 1977 provided us an excellent opportunity to examine the cold hardiness of this species. Our laboratory is in Bergen County, New Jersey, in the northern part of the state - USDA zone 6 b - considered by many to be a borderline zone for *M. grandiflora* in any case. The month of January, 1977 was the second coldest in 100 years in this New Jersey/New York metropolitan area, 10.4°F below the normal mean of 32.2° F for the month. In essence, our 1977 January was like a normal January for cities such as Des Moines, Iowa; Concord, New Hampshire; and Toronto, Canada. Despite this record cold month, the extreme low temperature recorded during this period was only -3°F, which is not abnormal for a zone 6 b climate. However, damage and loss to *M. grandiflora* was widespread. This has led me to believe that prolonged cold temperatures have a stronger influence on the cold tolerance of this species than more extreme cold for short durations.

Within a three-mile radius of our home in Glen Rock, about 20 miles northwest of New York City, are 28 established (in the ground 3 years or more) yard specimens of *M. grandiflora.* All of these are apparently seedlings, most planted by adventuresome home gardeners who by and large know very little about the plant, much less its real name. Thus, the "randomness" of the *M. grandiflora* seedling selections coupled with our unusually cold January provide ideal conditions for arriving at some hard climatic facts associated with the probability of survival of typical *M. grandiflora.*

Table I illustrates the difference between the low temperature extremes of the winters of '76 and '77:

TABLE I **EXTREME LOW TEMPERATURE - GLEN ROCK, N.J. (°F)**

	Winter 1976	Winter 1977
Dec.	11	7
Jan.	-2	-3
Feb.	9	6

Notice that there is no significant difference between the 1976 and 1977 winter seasons. One not looking at the column headings could easily accept both sets of temperature data as typical of neighboring cities for the *same* winter. On the other hand, let's look at the *average mean temperature** for those same winters:

TABLE II **AVERAGE MEAN TEMPERATURE - GLEN ROCK, N.J. (°F)**

	Winter 1976	Winter 1977	Normal**
Dec.	33.9	27.9	35.5
Jan.	25.6	21.8	32.2
Feb.	38.0	33.7	33.4

**Mean temperature* is defined as the sum of the daily maximum and the daily minimum divided by 2. The *average mean temperature* is simply the average of these means over whatever period of time we use, in this case the month.

***30 year normal for New York City.

Here there is a significant difference. In the critical month, January, the temperature in 1977 averaged 21.8°F. That is almost 4 degrees colder - every day of the entire month - than in 1976, and more than 10 degrees colder than what is normally expected.

How did these winters affect the survival of the 28 *M. grandiflora* specimens? Table III, below, illustrates what happened:

TABLE III **M. GRANDIFLORA SURVIVAL RATE - GLEN ROCK, N.J.**

	Number of Trees Examined	Number of Trees Surviving	Survival Rate	Extreme Low Temp.	January Average Mean
1976	28	28	100%	-2°F.	25.6°F.
1977	28	25	89%	-3°F.	21.8°F.

The data presented in Table III appears to support the theory that prolonged cold affects the survival of *M. grandiflora* more than simply extreme low temperature attainment. More importantly, it can be measured.

This analysis illustrates that it is possible to build a model which can be used to determine the survival rate of *M. grandiflora* for particular known climates.

The only thing that is needed is more data. Although the study tells us something quantitative about the chances of growing *M. grandiflora* in climates where the average mean gets as cold as 21.8°F., in any one month, it tells us nothing about its ability to survive average monthly mean temperatures of 15°F. or even 10°F. If any readers could provide similar, even very brief or sketchy information on the mortality rate of *M. grandiflora* in their areas (I would hope colder areas), perhaps such a model could be developed. Some of the areas which would be of particular interest:

City	Average Mean Temp. January 1977
Cincinnati, Ohio	12.0°F
Louisville, Ky.	18.6°F
St. Louis, Mo.	15.1°F
Detroit, Mich.	12.8°F

M. grandiflora is known to grow (at least before 1977) in the above areas. If it is possible that members and friends can provide information on *M. grandiflora's* survival rate, please remember the following: 1. Be as unbiased as possible in your selection of specimens. 2. The specimen should be well established—3 years or more. 3. If the specimen has died back to the ground or throughout most of the tree, call it dead. *M. grandiflora* will rarely die stone dead, though it may exhibit vigorous sucker growth even well up into the crown. Nevertheless, the tree is irreparably damaged and usually dies outright in a few years. 4. Get as many samples as possible. 5. It won't be necessary to provide climatic data. This will be given by the National Weather Service.

Let's take advantage of this opportunity to develop a definitive climatic model for *M. grandiflora* hardiness. Send all information to: Richard B. Figlar, c/o Worthington Service Corp., 233 Mt. Airy Road, Basking Ridge, New Jersey 07920.

NOTE: Dick Figlar's challenge for us to get busy while there are still corpses to count cannot be over emphasized. We invite other cogent and comprehensive hardiness studies about the world's most popular Magnolia. Some other factors that might be considered are known or estimated ages of trees (how well established and how many winters they've survived), whether drying winds accompanied the low temperatures, whether there was snow to mulch roots or protect branches, whether foliage or other individual characteristics affected the outcome, whether new or hardened growth was affected, available shelter, sunlight reflections from nearby structures, and pre-existing manmade or insect-disease damage.