Specters of the Night

John D. Carlson

In the summer of 1993 I began a series of investigations and experiments designed to test a hypothesis concerning the pollen shedding sequence of *Magnolia delavayi,* as put forward by Neil Treseder in his book *Magnolias* (1978. Faber and Faber, London). The assumption is based on Col. G. H. Johnstone's view, that the night flowering *M. delavayi* sheds it's pollen before the flowers open. Treseder expressed the view that this magnolia "differs from most if not all other temperate species" because, no other sheds its pollen in this manner. Treseder also felt that as a result of this peculiar train of events, the stigmas are only receptive after the tepals have fallen (*Magnolias*, p. 48).

Detailed monitoring of four flowers which my *M. delavayi* produced last year, combined with data recorded in previous years, showed clearly this magnolia opens it's flowers on *two successive nights*. Which confirms Dick Figlar's observations of his specimen (MAGNOLIA, 21(2), 1985-6, p. 3). I discovered that the stamens do not fall until the second night, which led me to theorize this meant it was likely the *stigmas were receptive on the first night of opening*. In order to test this idea, on the night of the 11th. July, I attempted to fertilize the stigmas of the first flower produced that summer. I used frozen pollen saved from the previous year to fertilize the flower. Unfortunately the temperature fell to a minimum of 7°C (44°F). The result was more or less a foregone conclusion: fertilization did not occur.

The next flower opened on 28th. July, temperatures were somewhat higher than previously, a recording thermometer showed that it remained a steady 14°C (57°F) all night. I attempted to fertilize this flower with pollen taken from the first flower (12th, July), and frozen for a short time. I daily watched the gynoecium, which soon began to show signs of development. It proceeded with considerable rapidity when compared with precocious flowering magnolias. It was soon apparent that it was fertile. As far as my own plant of *M. delavayi* is concerned, an infertile gynoecium undergoes a two stage process of degeneration. The first occurring approximately 17 days after the initial opening of the blooms, when a groove encircles the pedicle. The second stage occurs approximately 10 days later when a second groove encircles the pedicle; very shortly afterwards the gynoecium falls off.

A third flower opened on 19th August. This time I attempted fertilization, using pollen from the second flower (29th. July). The thermometer showed that the maximum temperature that night was 16.5°C (61°F) This experiment also proved to be successful. However, it was noticeable that the gynoecium did not develop as rapidly as in the previous flower.

Whilst the pollen appears to be low temperature setting, the daytime maximum temperatures following both successful attempts were 23°C (73°F) and 25°C (76°F) respectively. Thus it cannot be completely ruled out that success was due to the daytime temperatures. In spite of this, the fact that the flowers tend to close up by about 11:00 PM, to my mind, appears to indicate that the fertile period is over by then. If this is indeed so, then perhaps it is in keeping with other processes that seem unusually speedy in this magnolia, as compared with others, for instance the short life span of the flowers and the rapid development time of the gynoecium.

On 25th. November, I harvested both fruits, as they had begun to split. However, this was almost certainly due to a recent severe frost of minus 8.5°C (17°F). The seeds in both fruits were too undeveloped to be viable, and the interiors of the fruits were blackened owing to frost damage. The degree of development of the seeds leads me to believe that perhaps even British growers, with their rather poor summers, could set viable seed if the earlier flowers were fertilized. Even if it is not possible to obtain perfectly ripe seed it may still be possible to produce seed which is ripe enough. This is because magnolia seed can still be germinated when it is a little unripe.

Magnolia delavayi is at present a rather rare plant by reasons of the fact that it can only be propagated easily by layering. According to Treseder, "This species seems to set seed very sparingly in cultivation." (*Magnolias*, p. 48). The ability to set seed at temperatures as low as 14°C (57°F) would be important to growers, provided they could ripen the seed sufficiently. In fact fertilization is remarkably easy in this species, and, in my experiments, 30 to 40 seeds were found in each fruit. Even if British growers could not use this information, I would hope that growers in warmer climates could take advantage of it.

I feel that the lack of fertile fruit in Britain, if not elsewhere, can be explained fairly simply. First, the plant produces flowers quite sparingly, so that it would probably have to be a fairly large plant to have enough flowers at any one time in order than one could fertilize another. Second, numerous observations of my own specimen have shown that the blooms do not appear to attract insects. Third, flowers, surely, must on some occasions open when conditions are unsuitable for fertilization.

The size and shape of the two fruits I grew seem to bear out Johnstone's observations, which Treseder quotes, as describing the fruit cones "as being between 4 to 8 in. (10 to 20.5 cm) long and ovoid-oblong in shape" (*Magnolias*, p. 47). My fruits were the same shape as those described by Johnstone while the length was 4" and the diameter was 1.5" at its widest.

There were several points of interest that arose concerning various parts of the flowers: the stigmas were very small compared with other magnolias—they resembled tiny tufts of fur on the tips of the carpels; the gynoecium was buff colored with light pink shadings unlike the usual green color; the tepals move rapidly when the actual time of opening is at hand, especially when the air temperature is warm, as I have observed with a potted specimen indoors. I was actually able to detect the movement of the tepals.

The pollen, when shed from the stamens, is not granular, as in all other samples I have seen. Rather, the particles appear to stick together in very short, fine strings and give the impression of light orange-yellow "vermicelli."

There was a small leaf growing out of the floral bud that was to be the third flower. It survived splitting of the bud and tore entirely free from it, a thin petiole connecting it to the branch at a point just below the bud. This slowly developed into the leaf shown in the accompanying photograph. However, it never grew to more than 1/4 normal size but lasted until the severe frost of minus 8.5°C mentioned previously, when it finally died off. John D. Freeman expressed the view that this phenomenon of floral leaf blades is more likely to occur following a mild winter. This is because undifferentiated leaf blade material is more likely to be destroyed by cold weather (MAGNOLIA, p. 20). The winter of 92/93 was a mild one with a minimum temperature of minus 7°C (19°F) and generally not falling below minus 5°C (22°F). This incident thus appears to give support to his view.

This magnolia has been somewhat unfairly maligned as being a tender plant with very short lived flowers of a poor color. Contrary to these criticisms it is reputedly hardy down to minus 15°C (4°F), and I have certainly witnessed no damage at all at minus 10°C (14°F). Resistance to wind is remarkable. The plant is extremely leathery and tough. In my experience the flowers always last at least two and often four days, if conditions are cool and dry. By the second day the tepals are as yellow as any lemon while the fragrance is powerfully fruity and pervasive. Another favorable point is that it can tolerate alkaline soil, provided it is not too shallow and dry. It is certainly an exotic looking evergreen which can flower at only 30" tall, if vegetatively grown. The 5—8" diameter blooms are surely worthy to be called "Specters of the Night."

Furthermore, the discovery of the apparent low temperature setting properties of this pollen has persuaded me to make comparative recordings of ambient and actual flower temperatures in daytime when I make attempts at fertilization on many other magnolias this coming spring. I feel that such data might be useful to many growers and particularly, perhaps, to northern European growers with their rather uncertain climates. Additionally it is hoped that this article will persuade some magnoliaphiles to make attempts to hybridize *M. delavayi* with other magnolias. The apparent temperature requirements of the pollen may perhaps make it suitable for crossing with the precocious flowering magnolias. In spring, daytime temperatures would often equal or exceed that required for fertilization. It would then be most interesting to see whether the resulting progeny is a "specter" of the day or of the night. To those fortunate enough to be able to grow M. delavayi, it is certainly an interesting and valuable addition to their collections. ❧

The floral leaf blade associated with the third flower is shown above, before the flower opened. Arrow 1 shows the leaf blade. Arrow 2 shows the petiole.

The Magnolia Society Endowment Fund needs your support.
Please send your contribution to:

The Magnolia Society Endowment Fund
907 S. Chestnut Street
Hammond, Louisiana 70403-5102 USA

Contributions are tax deductible in the United States