

# New York State Flower Growers

INCORPORATED

BULLETIN 106

Secretary, Harold B. Brookins, Orchard Park, N. Y.

JUNE 1954

## Chrysanthemum Cutting Storage

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Rooted and unrooted chrysanthemum cuttings were stored for six weeks at 31°F. There were a number of difficulties encountered in the work with chrysanthemum cutting storage. A general statement may be made for cutting storage--never store a poor cutting and expect a good cutting after storage.

There were two distinct types of damage associated with storage, chilling injury and freezing injury. Chilling injury is a physiological breakdown, starting at the growing point and progressing down. Freezing injury is actual freezing of the tissues, which starts in the lower leaves and moves up. Both of these injuries appear as a blackening of the tissue, when removed from storage. The freezing injury was induced by gradually lowering the temperature to 25°F. At 31°F, freezing injury was never observed. Chilling injury occurred after six weeks, even though the cuttings were properly stored.

### Unrooted Cuttings

The variety Gold Coast was used for this work. Twenty cuttings were placed in one quart Mason jars and sealed with cellophane. Three storage temperatures were used; 31°F, 35°F, and 40°F. There were four treatments per temperature and one jar in each treatment was removed every two weeks. The treatments were:

1. Stored dry and placed directly into the propagation bench after removal from storage.
2. Conditioned in warm water for four hours at 40°F air temperature before storage; stored dry and placed directly into the propagation bench after storage.
3. Stored with the cut ends in moist vermiculite and placed directly into the propagation bench after storage.
4. Stored dry; conditioned in warm water for four hours at 40°F air temperature and then placed directly into the propagation bench.

Table 1

Results With Unrooted Cuttings  
Stored at 31°F

Number of Cuttings That Rooted  
Under Normal Propagation\*--  
10 Cuttings Per Treatment

Treatment	Weeks in Storage			
	2**	4	6	8
1-Stored Dry	7	10	10	3 <sup>o</sup>
2-Condition				
Before Storing	6	9 <sup>o</sup>	7 <sup>o</sup>	3 <sup>o</sup>
3-Stored Moist	5	8 <sup>o</sup>	7 <sup>o</sup>	5 <sup>o</sup>
4-Stored Dry				
& Condition				
After Storage	4	10	10	7 <sup>o</sup>

\* Note the same treatments when propagated under the mist rooted 100% up to the eight week treatment.

\*\* Disease in propagation bench.

Each treatment was sub-divided into normal propagation methods and mist propagation (N. Y. S. F. G. Bul. #103).

The cuttings stored at 31°F were superior to the other temperatures. A temperature of 35°F was satisfactory, but storage life was reduced. The 40°F stored cuttings turned yellow after a few weeks. The results shown and discussed will be that of the 31°F stored cuttings.

The limiting factor for storage time was chilling injury. Cuttings (treatments 2 and 3), which were allowed to take up water before or during storage showed the first signs of chilling injury. These two treatments had signs of injury after four weeks of storage. The other two treatments (1 and 4), which were stored dry, had no signs of chilling injury until eight weeks of storage.

One hundred per cent rooting was obtained in all treatments up to the eighth week of storage, when the cuttings were rooted under the mist. Using normal propagation, there was a higher per cent of rooting when the cuttings were stored dry (treatments 1 and 4).

### Rooted Cuttings

Rooted cuttings of the varieties Encore and Shasta were used in this work. The roots of the cuttings dried up and died, when the cuttings were stored dry. When the cuttings were stored with the moist media left on the roots, the roots remained alive during storage and the cutting was not checked when placed in the bench.

The cuttings were taken from stock plants grown at 60°F, rooted in vermiculite and placed in boxes lined with cellophane. The boxes were placed at 31°F and cuttings were removed every two weeks.

Chilling injury again limited the time of storage. This injury may be due to the lack of carbohydrates or some enzyme breakdown. Chilling was observed in the eight week treatment. In the early stages, chilling injury may serve as a pinch, but is very undesirable because the dead tissues favor the entrance of disease.

Table 2

Appearance of Rooted Chrysanthemum Cuttings  
Stored at 31°F

Variety	16 Cuttings Per Treatment							
	Weeks in Storage							
	2		4		6		8	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Encore	16	0	16	0	15	1	16*	0
Shasta	16	0	16	0	16	0	15*	1

\* Chilling injury observed in treatment.

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