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Low pressure storage and cut rose keeping quality trials

Specially contributed by

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THE low pressure storage techniques employ potential advantages for the cut-flower industry, especially as to handling peak production and improving sales potential. Only Bangerth (1973) has, until now, stored glasshouse cut-roses, namely Baccara, under low pressure without severe damage. The aim of the current work at the State Research Centre for Horticulture, carried out by Niels Bredmose, B.Sc.Hort., head of the Blueprint cropping and Hypobaric storage and keeping quality for cut-flowers division, has been to investigate the possibilities of storing the cultivated glasshouse rose, Belinda, at low pressure taking into account the subsequent keeping quality.

"Plants of Belinda were grown under glass at a minimum of 17°C at the horticultural research centre, and the flowers were harvested at various stages of development. Flowers were selected for uniformity in terms of development and stems were trimmed to equal length (between 40 to 45cm).

"Two experiments were carried out, the first in July/August and the second one was September/October 1977.

"During storage the flowers were placed horizontally on shelves in 2341 LPS steel chambers. Ten flowers per plot were used. The LPS equipment designed for 3'FAC. experiments (three temperatures combined with four pressures and two air velocity rates) is described in detail by Jensen and Rasmussen (1978).

"The keepability was measured in a special room without direct sunshine at 22°C, 60 per cent RH approximately 15W/M² emitted incandescent light, 14 hours a day. The flowers were placed individually in glass tubes, 180mm by 21mm containing tap water plus a preservative, Chrysal.

"Vase life was measured daily from the end of the storage period and was considered to have terminated when f' wer petals lost their turgidity and/or decorative value.

"The keepability of bud-cut Belinda roses was approximately 20 per cent better than for flowers harvested at the petals fully developed stage, but at the same time the flower diameter decreased by approximately the same percentage when bud-cut.

"The ageing of LP stored roses was retarded and their vase life extended by 1.5 to 3.5 days in comparison to NP stored roses.

"The effect was most remarkable for flowers not wrapped in plastic. In addition we found the average flower to be seven per cent larger for LP stored roses (9.7cm) than for MP stored ones (9.1).

"The average keepability was as good for LP stored roses after 21 days as for NP stored roses after seven days of storage. LP storage eliminated the "blueing" normally occurring in NP stored roses which if so turned muddy pink.

"Plastic wrapping especially influenced the roses stored at normal pressure. Plastic wrapped NP stored roses had 1 to 1.5 days longer vase life than NP stored roses without plastic. In experiment two plastic wrapping of NP stored roses also prevented development of "blueing". In experiment two some attacks from fungi "Botrytis" were developing during the vase life test from flowers without plastic wrapping.

"Bangerth (1973) succeeded in storing bud stage cut Baccara roses at 4°C for 42 days with a subsequent vase life of six days in a preservative containing sugar and hydroxyquinoline at 25°C twenty-four hours light.

"The results of the present experiment show that Belinda roses can be stored for at least three weeks at low pressure (6.3 kpa) low temperature (3°C) high humidity (98 per cent RH) and still maintain a vase life of more than seven days measured at 22°C 60 per cent RH fourteen hours a day. This tripled LP storing effect is presumed to be the result of low oxygen, partial pressure, and possibly low ethylene tension as well.

"Low concentration of ethylene can cause decreased keeping quality in cut-roses, the critical range for ethylene causing rose petal drop being 0.06ppn 0.2ppn according to Kaltale and Boodley (1970).

"Bud cut plastic wrapped Belinda roses had an average keeping quality of 8.6 days after LP storage. From our summer experiments we estimated that it may be possible to store Belinda roses at low pressure, low temperature for as much as four to five weeks and still keep a vase life of a minimum one week. Further experiments may show this.

"The perspectives in providing the industry with additional three weeks or more for planning and carrying out the transportation in the sales of roses are interesting. The results show that a consumer demand of approximately one week vase life can be complied with although the flower diameter decreases because the roses have to be cut at the bud stage.

"Flowers of Belinda roses harvested at two stages of development were stored dry wrapped or unwrapped for up to twenty-eight days at either normal atmospheric pressure or low pressure. Storage temperature was 3°C air humidity 98RH and air change 1.0 tome per hour. Upon removal from storage the keeping quality of the flowers was recorded at 22°C, 60 per cent RH 15W/M² emi[illegible] lig[illegible] fourteen hours a day. The ageing of low pressure stored roses was retarded and their vase life prolonged compared to roses stored under normal pressure. The average keeping quality (seven days) was as good or better for LP stored roses after three weeks storage as for NP stored roses after one week of storage.

"LP storage prevented "blueing" of the petals which is common for stored roses. The flower diameter was found slightly larger (seven per cent) for LP rather than NP stored roses. In NP stored roses polyprothelene wrappings caused between 1 and 1.5 days longer vase life and prevented "blueing". The keepability of bud cut-roses was approximately 20 per cent better and the flower diameter approximately 20 per cent smaller than for flowers harvested with the petals fully developed. The shown tripled LP storing effect is thought to be the result of low 0^2 partial pressure and possibly low C^2H to the fourth tension."