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CONTRACT REPORT

**Poinsettia: translation of the Dutch report
"Poinsettia: rijende of vallende ster?"
from Aalsmeer on the production and shelf-life of poinsettia**

Final Report 1996

**DUTCH SHELF-LIFE
RESULTS 1995/5**

POINSETTIA CV TRIAL 1994

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Foreword

This report describes the results of the shelf-life research with poinsettia cultivars during 1994. This research took place in conjunction with the NTS and breeders/propagators of poinsettia (*Euphorbia pulcherrima*). The importance that the industry attaches to this research is considerable.

Summary

At two nurseries two crops of eight cultivars were grown. The cultural assessments by the growers are included as Appendix I in this report. Assessment of the eight varieties was carried out at the Research Station at Aalsmeer. The variety Capri had, on average, the best shelf-life. The varieties Cortez, LB Freedom and M92 were generally poor. The variety 559 showed a marked deterioration in quality after four weeks in shelf-life.

1. Introduction

In 1990 work at the Research Station in Aalsmeer commenced comparing Poinsettia cultivars. The basis of these comparisons was to establish differences between varieties. The varieties were assessed for 'suitability', disease resistance and quality after marketing. The reason for this poinsettia research was due to the considerable variation in varieties within the existing range. In addition, untested new cultivars were appearing on the market.

The greatest problem with poinsettia is shelf-life for the consumer in the home. The ornamental value is strongly influenced by the occurrence of yellow leaves, leaf loss, *Botrytis* and cyathia loss. It is therefore of great importance to test both the existing range, and new cultivars for quality after harvest, so that poorer varieties do not appear prematurely on the market and give the product a negative image.

Trials over the past four years had sufficient impact for a follow-up to be run during the 1994 season. From earlier trials it appeared that the different performance characteristics recorded are based both on variety and origin. It is clear that the variety effects are greater than the grower effects, however, in the trials it became clear that the effect of grower in some cases can be of considerable influence, for instance in respect of *Botrytis* sensitivity. Two nurseries with two different cropping systems were studied so that the possible influence of this on shelf-life could be tested. In this trial new varieties were compared with the reference variety 'Angelica'.

The management of the trial was in the hands of an NTS working group with the Research Station conducting the shelf-life assessment. The DLV (Advisory Service) was asked for support with the field trial, with NTS conducting the coordination between the different parties. The results were assessed by the breeders/propagators and the participating growers. During the season open afternoons were organised to give these groups the opportunity to assess progress for themselves. This report describes results of the shelf-life assessments. The results of the trials are summarised in Appendices I and II.

1.1 Objective

The objective of the trial was to test new varieties for cropping performance, transportability and shelf-life. Knowledge of these characteristics can assist the grower in his choice of variety for his particular market.

2. Material and Method

2.1 Trial Protocol

The variety trial was divided into two parts:

- the selected varieties were grown under their own specific cropping conditions at two different nurseries. The varieties were assessed on a number of criteria of importance to the grower (see Appendix 1 and 2).

- assessment of the varieties during shelf-life. Plants were assessed on a number of criteria of importance to the trader, retailer and consumer. This trial is described in this report.

In the 1994 season eight different varieties were compared on two Dutch nurseries; J. van den Burg in Den Hout and the nursery of F. van de Linden in Oud Beijerland (Appendix 1). The trial was repeated twice under different light conditions, namely a blacked-out crop and the non blacked-out crop (normal crop).

The varieties in the 1994 growing season for both cropping periods were: new varieties 1-7 and breeder Reference variety 'Angelica'.

- Trial Diary:
1. Blacked-out crop
 - plants were potted in week 31
 - plants marketable from week 46
 - start shelf-life trial from week 46
 2. Normal crop
 - plants were potted in week 33
 - plants were marketable from week 49
 - start shelf-life trial from week 49

The number of rooted cuttings per variety, per planting date, per nursery was 100. Plants from the centre of the plots were taken from the glasshouse for the shelf-life trial. At the moment that the plants had at least one open flower they were taken from the plots. The plants were sleeved in the usual way and packed (Danish box and perforated sleeve).

The shelf-life assessments used: 10 plants per new variety and 20 plants of the reference variety from each nursery and growing period.

In contrast to last year, where a number of plants from each variety underwent transport simulation whilst some went directly into shelf-life, this was only carried out with the reference variety. All the new varieties underwent a transport simulation and were subsequently placed in shelf-life. A number of the changes were made from 1993: The number of days of transport simulation was reduced from seven to four days and the light level in shelf-life was reduced to 1.5 W/m², this better reflected winter conditions. The period in shelf-life was increased to eight weeks.

The conditions in shelf-life and the transport cell of the experimental station were as follows:

	Shelf-life	Transport cell
temperature	20° C	15° C
relative humidity	60%	70%
light	12 hrs/day	none
radiation level	1.5 W/m ²	-
lamp type	TL58W.colour 84	-
air changes	once per 2 hrs	-

The plants received mains water according to need by means of ebb/flood.

2.2 Observations

In the past the following five criteria were taken into account when comparing varieties: cyathia loss, leaf yellowing, leaf drop, *Botrytis* and 'presentation' (overall quality). This is described in more detail.

- cyathia drop upper umbel
 - number of umbels which lost cyathia
 - number of umbels without cyathia loss

This was considered detrimental at the start, and after one week in shelf-life.

The other plant characteristics were assessed at the start and weekly thereafter:

- leaf yellowing
 - number yellow leaves

- leaf drop
 - 0 = no leaf loss
 - 1 = less than 25% leaf loss
 - 2 = 25-50% leaf loss
 - 3 = 50-75% leaf loss
 - 4 = more than 75% leaf loss

- *Botrytis*
 - location as well as number of lesions recorded

- presentation
 - general assessment of decorative value, using a scale of 0 to 5.
 - 5 = very good, no loss of ‘flowering’ and/or damage
 - 4 = good, slight appearance of ageing at one location
 - 3 = sufficient, several signs of slight ageing, or on one point with minor ageing
 - 2 = poor, minor ageing on several sites
 - 1 = bad, one site with severe ageing
 - 0 = very bad, several sites with severe ageing or one site with extreme ageing

Observations:

- cyathia loss resulted in a reduction in the score for presentation of 1 point, regardless of the seriousness of the cyathia loss.
- all eye-catching defects were recorded.
- when a plant scored a 0 or 1 for presentation it was thrown away.

The observations of the Research Station for both the crops (blacked-out and non blacked-out) ended after eight weeks in shelf-life.

3. Results

The start date of the crop for all varieties was at about the same. However, because of differences in the duration of crop production between the nurseries not all varieties entered shelf-life at the same time. In addition to the timing of the blacked-out crop compared to the normal crop there was a difference in delivery time. Table 1 gives an overview of the starting dates of the shelf-life trial.

Table 1 Overview of the starting date (week no.) of the shelf-life trial for the varieties, originating from the two cropping methods at both sites

Crop Grower	Blacked-out		Normal	
	J. van de Burg	K van der Linden	J. van de Burg	K. van der Linden
Start week	44	45	47	49

For the researchers and visitors to the shelf-life facility (during the domestic room period), it was obvious that the cultivars varied considerably. In addition, it was noticeable that there were considerable differences relating to the origin (grower) of the crops. During the final flowering period this difference became very clear, affecting the shelf-life performance. During the final phases of the trial there was the opportunity for visitors to examine the varieties. The assessment of the blacked-out and normal crops can be found in Appendix 3.

3.1 Average results

During weekly observations scores were recorded and plants were thrown away when the value for presentation was a 1 or a 0. The plants were generally assessed for eight weeks. Where a plant was still assessed as satisfactory after eight weeks then this meant a shelf-life of at least eight weeks was achievable. This was not a maximum shelf-life, but indicated shelf-life potential. In earlier trials the assessment period was shorter and therefore maximum shelf-life was less well defined.

It was desirable for growers and researchers to get an impression of the shelf-life after a period of two months in the ‘consumer’s home’.

From Table 2 it appeared that the plants from J. van de Burg’s blacked-out crop were, on average, over the period of eight weeks, better than the plants of K. van der Linden. The difference however was not great. For the ‘normal’ crop the picture was clearly different, with the plants of K. van der Linden scoring higher than those of J. van de Burg, this was particularly clear at the end of the eight week period. Also evident was the reduction in quality with time when comparing the plants of J. van de Burg with K. van der Linden. This illustrates the effect of plant origin (grower).

Table 2 The average score for presentation after plants had been in shelf-life for 2, 4 and 8 weeks

Crop Grower	Blacked-out		Normal	
	J. van de Burg	K van der Linden	J. van de Burg	K. van der Linden
2 Weeks in shelf-life	3.8	3.4	3.7	3.7
4 Weeks in shelf-life	3.0	2.7	2.8	3.3
8 Weeks in shelf-life	1.7	2.1	1.7	2.4
Average of 8 weeks	3.2	3.0	3.0	3.4

Table 3 Comparison of eight varieties after 4 and 8 weeks in shelf-life

Crop: Grower: Weeks in shelf-life	Blacked-out				Normal			
	J. van de Burg		K van der Linden		J. van de Burg		K. van der Linden	
	4	8	4	8	4	8	4	8
Variety:								
Capri	3.0	1.9	3.0	2.3	3.5	2.3	4.0	3.0
Menorca	3.0	2.2	2.9	2.0	2.8	1.9	3.4	2.3
559	3.0	0.	3.1	2.8	2.8	1.4	4.0	3.0
LB Freedom	3.6	2.6	3.3	2.8	2.4	0.6	4.0	2.8
Sonora	3.3	1.9	2.9	2.6	3.6	2.2	3.8	2.4
Cortez	3.2	2.1	2.8	1.6	1.9	1.5	3.6	2.7
M92	2.9	1.7	2.1	1.1	2.9	1.8	3.9	2.6
Angelica - transport	2.8	1.7	2.2	1.9	3.0	2.0	3.7	2.5
Angelica - direct*	2.8	1.0	2.2	1.8	3.1	1.7	4.0	3.0

* directly into shelf-life

In Table 3 the results are presented for each variety. It appeared from this that the influence of grower varied somewhat with variety, this is particularly clear with 559 and LB Freedom. In the figures in Appendix 4 the course of the quality trends during the eight weeks are shown.

In order to compare the results with previous years the results are shown after four weeks in shelf-life in Table 4. For cyathia loss the records after one and two weeks in shelf-life have been used. For leaf yellowing, leaf loss and *Botrytis* the records after two and three weeks in shelf-life are used.

With Table 4 it must be remembered that this represents the average over both crops and growers. For the separate crop grower combinations the results differ per variety (see Table 3).

Table 4 Average quality per variety after four weeks in shelf-life and the degree of cyathia loss, leaf yellowing, leaf loss and *Botrytis* during the first three weeks in shelf-life

Variety	Quality	Cyathia loss	Leaf yellowing	Leaf loss	<i>Botrytis</i>
Capri	3.0	++	++		+
Menorca	3.0	++	++	+	
559	3.0	++	++	+	+
LB Freedom	3.3	+++	+		+
Sonora	3.4	+++	+	+	+
Cortez	3.2	++	+	+	+++
M92	2.9	++	+++	+	++
Angelica - transport	2.9	++	+	+	+++
Angelica - direct	3.0	++	+	+	++

Sensitivity:

	not sensitive
+	some sensitivity
++	sensitive
+++	very sensitive

The variety trialling of poinsettia appears to remain necessary. New varieties constantly appear on the market, but improvements in quality are often minimal. This year it appeared from the analysis that performance is influenced by variety, cropping period and grower. The influence of cropping/grower was greater than other years, this means that the cropping conditions on the nursery has an important influence on the quality of the product. For variety comparison this is an additional complicating factor. On the other hand, shelf-life assessment may suggest areas for improvement in culture. For example, in this trial it is known that Van de Burg used, on average, warmer conditions than Van der Linden. In addition Van der Linden applied control against *Botrytis* in the blacked-out crop but not in the normal crop, therefore considerable differences were found between crops in the level of infection with *Botrytis*.

From the trends in quality during the eight week period it would suggest that longer assessment is not a waste of time. For instance the variety 559 from the blacked-out crops appeared to deteriorate quickly in quality as a result of yellow leaves and leaf loss after this period.

A firm conclusion about which variety is best cannot be made on shelf-life alone. Cultural aspects are equally important. In Appendix 1 the observations of the growers are summarised. The visual assessment by growers and breeders during production is included in Appendix 2.

On average Capri appears to score best for shelf-life. The varieties Cortez, LB Freedom and M92 were less satisfactory.

Shelf-life variety trials should be integrated with a reference test, in which more attention can be given to damage during transport and on total assessment of all characteristics. For the growers cultural information remains of importance.

APPENDIX 1 Cultural assessment

Recording of cultural technical information

	J.v/d Burg	K. v/d Linden
nursery size	10,400 m ²	13,500 m ²
growing system	concrete floor, mobile containers	flood mat
irrigation system	ebb/flood	spray line
irrigation water	rainwater (100% closed)	rainwater and osmose
dosing CO ₂	to 800 ppm at 0% ventilation at 8% ventilation to 200 ppm	400 ppm

Cultural information per cultivar

Cultivar	‘Capri’
Compactness	very good
Build-up/firmness	very good
Branching out	very good
Spot formation	not present
Branch breakage	not present
Leaf formation	very good
Leaf colour	very good
Roots	very good
Leaf formation umbel	upright, shiny
Umbel size	very good
Umbel colour	somewhat blue red
Cyathia formation	poor, often half-grown cyathia
Reaction time	8 weeks
Growth regulator use	poor (later starting and easier stopping for the sake of umbel development)
<i>Botrytis</i> sensitivity	little - with overhead irrigation some sensitivity in umbel
General impression	very good
Observations	the branches are at the same height from the start. Good for packing.

Cultivar	‘Menorca’
Compactness	good
Build-up/firmness	good
Branching out	very good
Spot formation	not present
Branch breakage	some
Leaf formation	very good
Leaf colour	very good
Roots	good
Leaf formation umbel	upright, crinkled
Umbel size	good
Umbel colour	good
Cyathia formation	good
Reaction time	8-9 weeks
Growth regulator use	normal, temporary reduction
<i>Botrytis</i> sensitivity	not sensitive
General impression	good
Observations	with close spacing trouble with yellow leaf. Vigorous growth

Cultivar	‘559’
Compactness	very good
Build-up/firmness	very good
Branching out	poor
Spot formation	not present
Branch breakage	none
Leaf formation	very good
Leaf colour	good, bit light
Roots	good
Leaf formation umbel	horizontal, shiny
Umbel size	good
Umbel colour	light red
Cyathia formation	good
Reaction time	8 weeks
Growth regulator use	poor
<i>Botrytis</i> sensitivity	not sensitive
General impression	good
Observations	during this trial branching was poor, possibly as result of heavy cuttings. Vigorous growth.

Cultivar	'Late Blooming Freedom'
Compactness	poor
Build-up/firmness	acceptable - bad
Branching out	acceptable
Spot formation	not present
Branch breakage	present - no problems during packing
Leaf formation	good
Leaf colour	good (dark type)
Roots	poor - bad
Leaf formation umbel	horizontal, crinkly
Umbel size	normal
Umbel colour	dark red, many half coloured umbels present with black veins
Cyathia formation	poor
Reaction time	8-9 weeks
Growth regulator use	normal
<i>Botrytis</i> sensitivity	not sensitive
General impression	poor - bad
Observations	sometimes premature loss of cyathia. Shows strong growth in the second half of the crop (tends towards 'shooting through')

Cultivar	'Sonora'
Compactness	poor, too compact
Build-up/firmness	poor, thin branches
Branching out	very good
Spot formation	not present
Branch breakage	not present
Leaf formation	bad, hanging over
Leaf colour	good, very dark
Roots	bad
Leaf formation umbel	hanging over, shiny
Umbel size	bad, very large, sometimes over 20 cm
Umbel colour	dark red
Cyathia formation	few, premature cyathia loss
Reaction time	7-8 weeks
Growth regulator use	few
<i>Botrytis</i> sensitivity	not sensitive
General impression	bad
Observations	weak growing variety chance of damaging umbel with packing

Cultivar	'Cortez'
Compactness	poor, too compact
Build-up/firmness	poor, thin branches
Branching out	good
Spot formation	not present
Branch breakage	not present
Leaf formation	poor, hanging over
Leaf colour	good, very dark
Roots	bad - good
Leaf formation umbel	hanging over, shiny
Umbel size	good, large and pointed
Umbel colour	dark red, many half coloured umbels present with black veins
Cyathia formation	few
Reaction time	7-8 weeks
Growth regulator use	few
<i>Botrytis</i> sensitivity	not sensitive
General impression	bad
Observations	weak growing variety

Cultivar	'M92'
Compactness	good
Build-up/firmness	good
Branching out	good
Spot formation	not present
Branch breakage	not present
Leaf formation	good
Leaf colour	good
Roots	acceptable
Leaf formation umbel	horizontal, crinkly
Umbel size	good
Umbel colour	light red
Cyathia formation	good
Reaction time	8 weeks
Growth regulator use	often
<i>Botrytis</i> sensitivity	not sensitive
General impression	acceptable
Observations	vigorous growing crop. Growth regulator application difficult because of uneven branch height.

Cultivar	'Angelica'
Compactness	good
Build-up/firmness	good
Branching out	very good
Spot formation	present, many
Branch breakage	few
Leaf formation	good
Leaf colour	good
Roots	poor (thin)
Leaf formation umbel	upright, crinkly
Umbel size	good
Umbel colour	red, greyish with high temperatures
Cyathia formation	good
Reaction time	8 weeks
Growth regulator use	often
<i>Botrytis</i> sensitivity	not sensitive
General impression	good
Observations	vigorous growing crop, even branch height, branch breakage possible at the outside branches with large plants

APPENDIX 2 Assessment at the end of production

Assessment of the plants at the end of the crop by growers and breeders

Variety	Branching	Compactness	Leaf colour	leaf conditions	<i>Botrytis</i> sensitivity	flowering evenness	general impression
Capri	4.0	3.8	3.7	3.8	3.9	3.9	3.8
Menorca	4.2	4.0	3.4	3.6	4.1	2.5	3.2
559	2.8	3.4	3.6	3.6	4.0	3.3	3.1
LB. Freedom	3.6	3.3	4.3	3.7	3.9	3.6	3.3
Sonora	3.6	3.8	3.9	3.1	4.1	3.9	3.3
Cortez	2.9	3.1	4.0	3.4	3.9	3.8	3.0
M92	3.9	2.8	3.3	3.6	4.0	3.3	3.3
Angelica	4.3	3.8	3.6	3.8	4.0	3.7	3.8

1 = bad/sensitive, 5 = very good/not sensitive

APPENDIX 3 Assessment in shelf-life

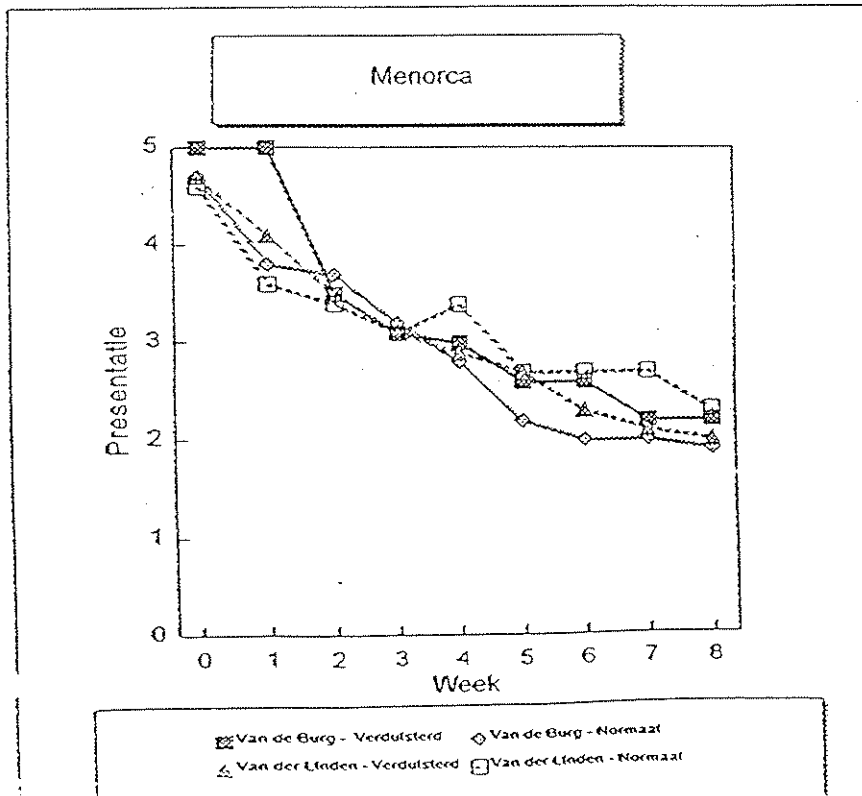
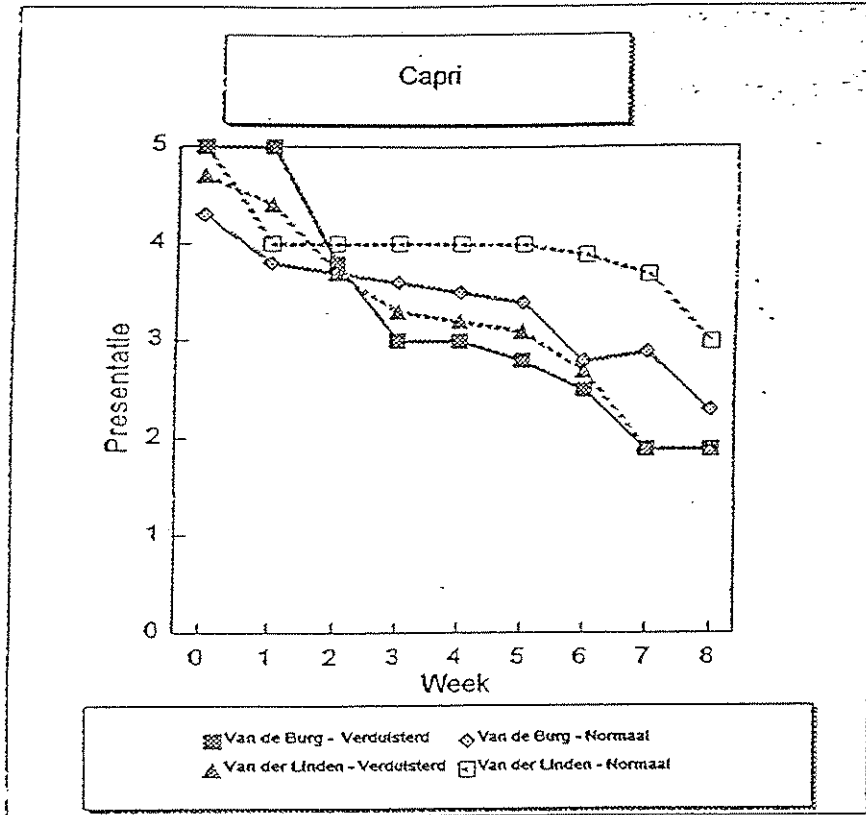
Assessment of the plants in shelf-life by growers and breeders

Crop: Grower:	Blacked-out		Normal	
	J. van de Burg	K van der Linden	J. van de Burg	K. van der Linden
Variety:				
Capri	3.6	2.9	2.6	3.8
Menorca	3.0	3.0	2.6	3.4
559	3.9	3.9	2.5	4.4
LB Freedom	3.4	3.3	2.3	3.6
Sonora	3.0	2.7	3.3	3.7
Cortez	3.8	3.2	2.7	3.8
M92	3.0	2.4	1.9	3.2
Angelica - transport	3.0	2.9	1.8	3.8
Angelica - direct	3.1	3.0	1.8	3.5

1 = bad, 5 = very good

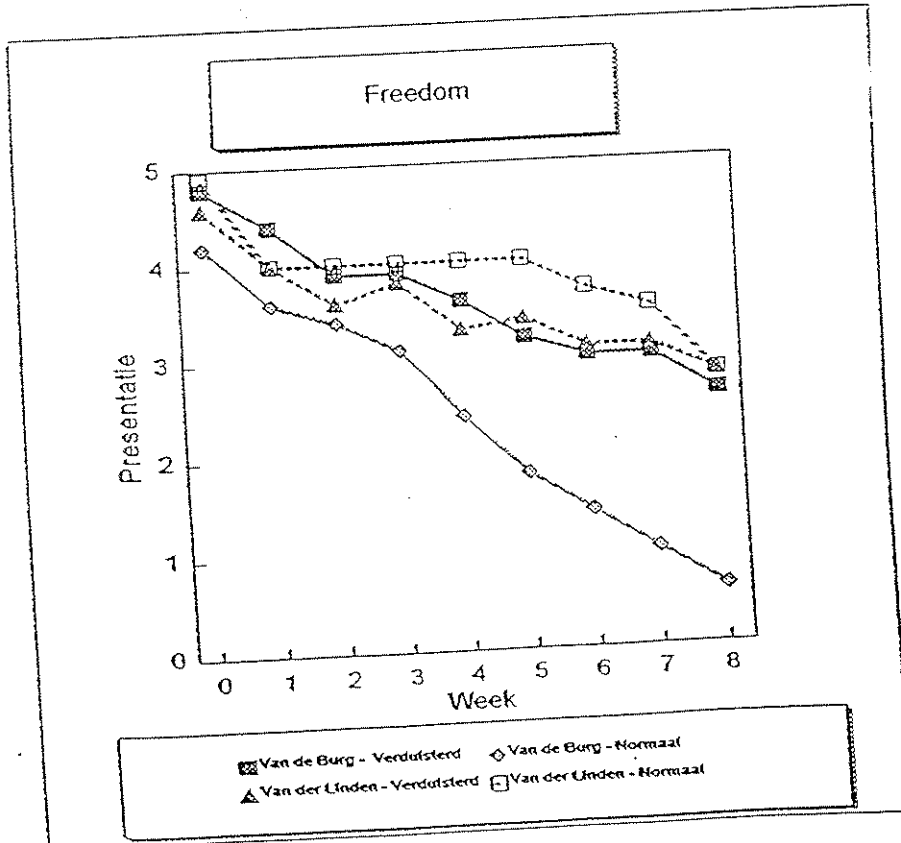
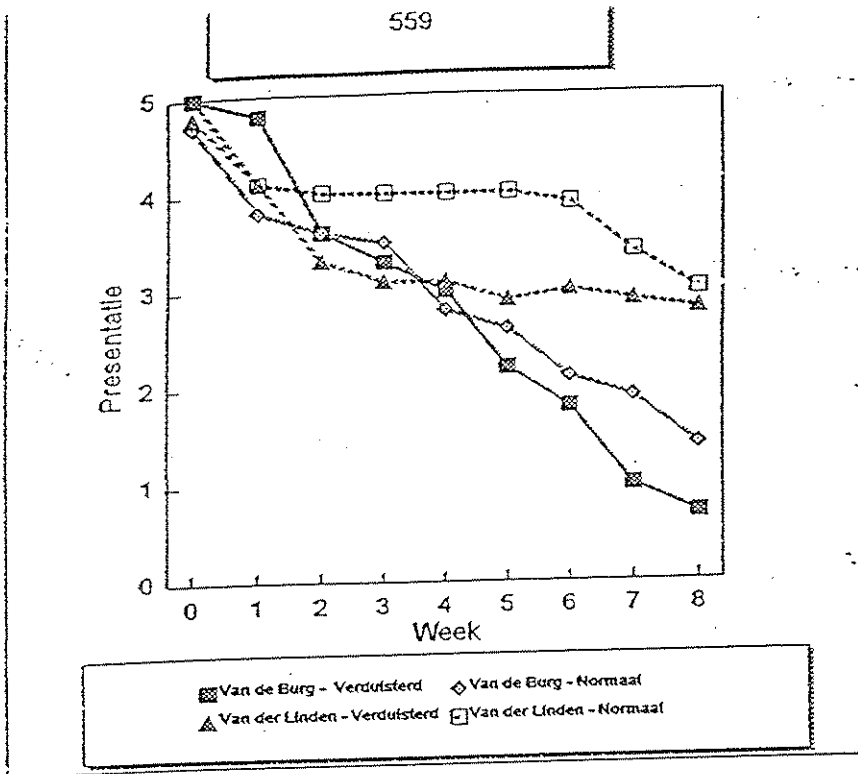
APPENDIX 4

Course valuation presentation in time during eight weeks period in the final flowering space . For description see paragraph 2.2



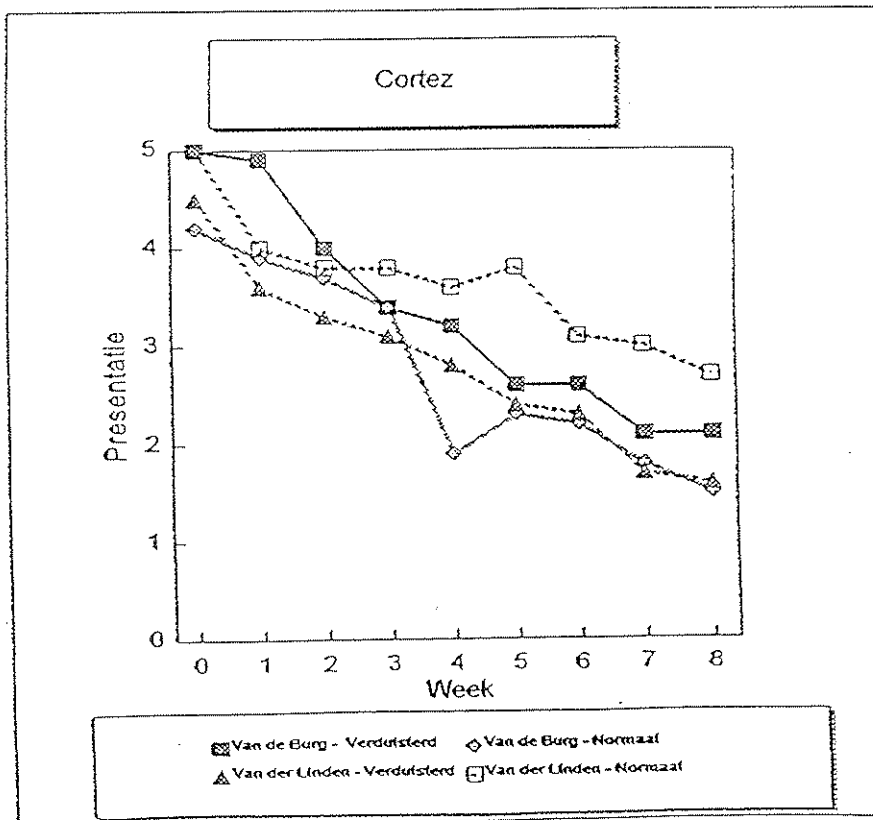
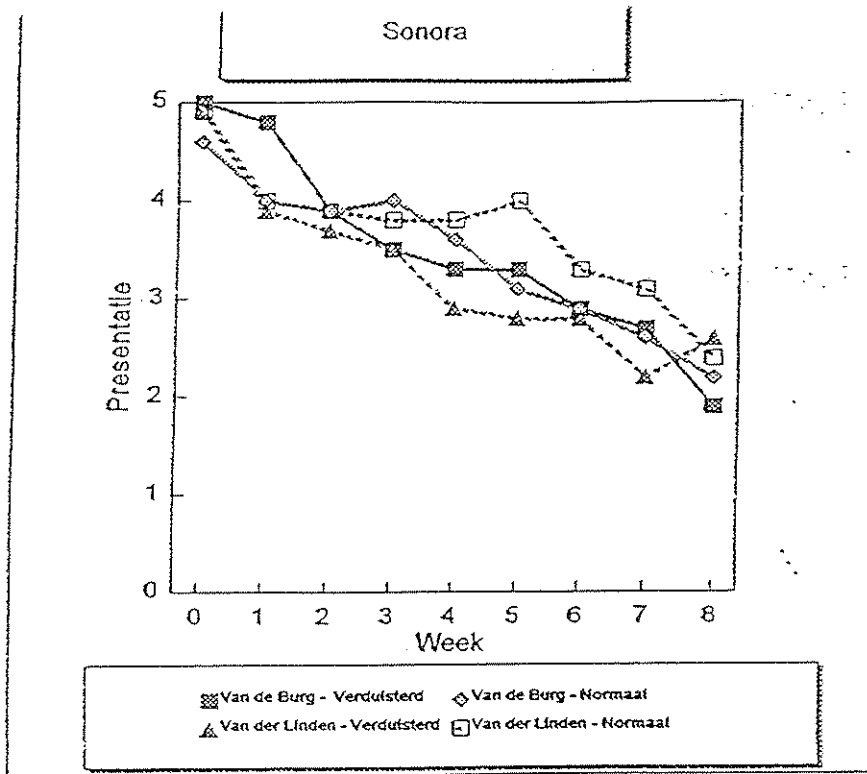
APPENDIX 4

Course valuation presentation in time during eight weeks period in the final flowering space . For description see paragraph 2.2



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APPENDIX 4

Course valuation presentation in time during eight weeks period in the final flowering space . For description see paragraph 2.2

