Project title:	Narcissus: Effect of fungicide foliar sprays on the incidence of bulb rots
Project number:	BOF 41a
Project leaders:	Dr T.M. O'Neill, ADAS Arthur Rickwood Mr G.R. Hanks, Crop & Weed Science Department, HRI, Kirton
Report:	Final Report, December 2001
Previous reports:	Annual Report, December 2000
Key worker:	Dr K.R.Green, ADAS Arthur Rickwood
Location of project:	ADAS Arthur Rickwood Mepal, Ely Cambs, CB6 2BA Horticulture Research International, Kirton, Boston Lincs, PE20 1NN
Project co-ordinators:	Mr Brian Taylor and Dr Gordon Flint
Date commenced:	1 July 2000
Date completion due:	31 December 2001
Key words:	Bulb rot, basal rot, foliage die-back, fungicide treatments, narcissus, neck rot, *Fusarium oxysporum f.sp. narcissi*, *Botrytis narcissicola*, *Penicillium* spp., Scala, Folicur, Bavistin DF, Benlate, Ronilan, Bravo 500, Amistar, Unix, Dithane.

The results and conclusions in this report are based on an investigation conducted over two years. The conditions under which the experiment was carried out and the results obtained have been reported with detail and accuracy. However because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Dr T. M. O'Neill
Principal Research Scientist
ADAS Arthur Rickwood

Signature.. Date...

Mr G.R. Hanks
Principal Research Scientist
HRI
Kirton

Signature... Date...

Report authorised by:

Dr M. Heath
Team Manager
ADAS Arthur Rickwood

Signature... Date...

Dr D. Gray
Head of Crop and Weed Science Department
HRI
Wellesbourne

Signature... Date...

Contents

PRACTICAL SECTION FOR GROWERS

COMMERCIAL BENEFITS OF THE PROJECT

The results of this project will reassure growers of narcissus that, under normal conditions, there is unlikely to be a risk of increased neck rot as a result of using a full fungicide spray programme effective at controlling foliar pathogens, delaying leaf die-back and increasing bulb yields.

BACKGROUND AND OBJECTIVES

Neck rot has been noted as a major cause of narcissus bulbs being rejected for export. Recent work on neck rot (HDC Project BOF 31b) has suggested that, when leaf senescence had been delayed due to fungicide applications, inoculation with *Fusarium oxysporum* f.sp. *narcissi* may subsequently increase the incidence of neck rot compared with plants that had not received fungicide sprays. Fungicides and fungicide timings are being tested for their control of narcissus smoulder and white mould in field trials, but any fungicide treatment that encourages neck rot, although combating leaf disease, is likely to be unacceptable to the industry. The current project was set up to evaluate the effects of fungicide spray programmes on the development of neck and other bulb rots in storage. The project utilised four existing field trials from another project, BOF 41, one in each of two years (2000 and 2001) at two sites (ADAS Arthur Rickwood, Mepal, Cambridgeshire and HRI, Kirton, Lincolnshire).

SUMMARY OF RESULTS AND CONCLUSIONS

In experiments in 2000 at both sites, the incidence of neck rot was low (<4%) for individual fungicide treatments, despite the use of storage conditions (25°C and 80% relative humidity for 5 weeks) that are considered conducive to neck rot development. The combined incidence of all types of rot (neck rot, basal rot, whole rot, other minor rots and damage due to narcissus fly larvae) was also low, with less than 5% of bulbs affected in individual treatments. Despite significantly longer green leaf area retention in the fungicide-treated plots, there was no effect of fungicide treatment at either site on the development of neck rot. Similarly, there was no effect of fungicides on other types of bulb rots individually or in total.

While the percentage of total rots was similar at both sites, it was apparent that for Mepal bulbs the greatest proportion of rotting was due to neck rot, compared with basal rot for Kirton bulbs. It was also interesting to note that the incidence of damage due to narcissus fly larvae was higher at Kirton, with 2.5% in the untreated control compared with 0.1% at Mepal.

In the experiment at Mepal in 2001, the incidence of neck rot, basal rot, whole rot, other minor rots and insect damage remained generally low (<5% for individual treatments) and was not affected by fungicide treatments. However, at Kirton, an area where narcissus bulbs are grown on a large scale and where, presumably, inoculum pressure is high, there was an association in some fungicide programmes (where Folicur was used during the flowering phase) between extended green leaf area retention and a higher incidence of whole bulb rot (due to *Fusarium* spp.) and combined rots.

Isolation from bulbs with neck rot yielded *Fusarium* spp., *Penicillium* sp. and *Botrytis narcissicola* in 2000 and only *Penicillium* sp. in 2001. These results support previous reports indicating that neck rot is caused by a complex of pathogens, rather than by a single species. Other rot types consistently yielded *Fusarium* spp.

ACTION POINTS FOR GROWERS

- When there is considered to be a high risk from bulb rots caused by *Fusarium oxysporum*, such as a known infected planting stock, close rotation or a warm summer, do not use foliar fungicide treatments of Folicur or Bavistin DF during or after flowering in the lifting year of the crop as these fungicides significantly delay foliage die-back and hence may increase the incidence of bulb rots.

- Where bulb stock, site and crop management practices indicate no specific risk from *Fusarium*, the results from this project indicate that foliar fungicide sprays (known to be highly effective for controlling foliar pathogens) have neither an adverse or beneficial effect on the incidence of bulb rots.

- Other research work (BOF 41) has shown that foliar fungicide sprays applied to crops where there is smoulder, can result in large increases in bulb yield.

ANTICIPATED PRACTICAL AND FINANCIAL BENEFITS

- The results of Project BOF 41a will reassure growers that, under normal conditions, there is unlikely to be a risk of increased neck rot as a result of using a full fungicide spray programme effective at controlling foliar pathogens, delaying leaf die-back and increasing bulb yields.

- Under conditions of high inoculum pressure from *Fusarium oxysporum*, however, such as when growing stocks with a history of basal rot, using close rotations or in warm weather in intensive narcissus growing areas, curtailing the fungicide spray programme during and after flowering in the lifting year of the crop is advisable to reduce the likely incidence of bulb rots.

- In informing bulb growers on their fungicide spray programme for narcissus, these findings will either (a) reinforce the value of timely fungicide sprays, leading to increased bulb yields and reduced levels of foliar diseases, or (b) allow savings to be made on fungicide sprays that might increase the incidence of subsequent bulb rots. Foliar fungal diseases of narcissus are thought routinely to result in yields losses of 10%, while bulb losses in excess of 10% are not uncommon as a result of bulb rot pathogens. On the basis of an annual UK disposable bulb yield of 30,000 tonnes and current bulb prices, a 10% yield loss (in bulbs alone) would be valued at £900,000.

SCIENCE SECTION

INTRODUCTION

Recent HDC-funded research on narcissus neck rot (BOF 31b)[1] has suggested an association between application of a fungicide spray programme and increased incidence of neck rot. In this project, the relationship between various husbandry factors and the occurrence of neck rot was examined. There was found to be a higher incidence of neck rot, on plants that were inoculated with neck rot pathogens, when fungicide applications delaying foliar senescence had been applied. It was suggested that the persistence of green leaf tissue allowed an extended period of infection of the bulbs through the leaves.

As part of Horticulture LINK project 188 (BOF 41), fungicides and fungicide timings are being evaluated for the control of smoulder and white mould. However, any fungicide treatment that, whilst combating foliar diseases, encourages neck rot, is likely to be unacceptable. The current project was initiated to evaluate the development of neck and other bulb rots in storage, utilising existing field experiments from the LINK project in which a range of fungicide spray treatments had been applied.

MATERIALS AND METHODS

Site and crop details

Bulbs for neck rot assessments were obtained from field trials conducted in 1998-2000 (trial 1) and 1999-2001 (trial 2) with narcissus cv Carlton under Project BOF 41, at both ADAS Arthur Rickwood, Mepal, Cambridgeshire and HRI, Kirton, Lincolnshire. Detailed site and crop information is provided in the reports for the original project[2], and the trial diaries are summarised in Appendix 1 of this report. The bulbs for the two sites were from the same commercial stock. Briefly, the trials were planted in September 1998 and 1999, respectively, and each was grown for two years using typical husbandry techniques for the region, except that no routine fungicide applications were made. Experimental fungicide spray programmes for trials 1 and 2 were applied in spring 2000 and 2001 respectively, prior to bulb harvest in July 2000 and 2001.

Treatments – 2000

The fungicide spray treatments applied to trial 1 in 2000 were:

1. Untreated	
2. Benlate + Dithane	0.5 kg/ha + 1.5 kg/ha
3. Ronilan	1.0 l/ha
4. Bravo 500	3.0 l/ha
5. Scala	2.0 l/ha
6. Amistar	1.0 l/ha

[1] Narcissus neck rot: Control of infection by *Penicillium*, *Fusarium* and *Botrytis*. Final Report on HDC Project BOF 31b, Horticultural Development Council, East Malling.
[2] Narcissus leaf diseases: Forecasting and control of white mould and smoulder. First Annual Report (April 1999), Second Annual Report (May 2000) and Third Annual Report (November 2001) on HDC Project BOF 41, Horticultural Development Council, East Malling.

7. Folicur 1.0 l/ha
8. Unix 0.6 kg/ha

Treatments were applied six times at about fortnightly intervals using an Oxford precision sprayer fitted with flat fan nozzles, applying 1000 litre water /ha at 2-bar pressure. Sprays were applied over the plots (two ridges wide at Mepal, three ridges wide at Kirton) and extending to cover half of each flanking guard row. The spray dates were 17 February, 13 March, 31 March, 19 April, 9 May and 20 May 2000 at Mepal, and 17 February, 10 March, 20 March, 31 March, 19 April and 22 May 2000 at Kirton.

Treatments - 2001

In 2001, treatments were directed at three phases of smoulder development, with two sprays applied at each phase:
Phase I - Primary lesions at crop emergence
Phase II - Secondary lesions around flowering
Phase III - Secondary lesions after flowering

Treatments were compared with an untreated control and a 6-spray Folicur programme, a treatment that performed very well in 2000. The same set of treatments was tested at ADAS Arthur Rickwood and HRI Kirton. Products used were:
1. Ronilan FL 1.0 l/ha
2. Folicur 1.0 l/ha
3. Scala 2.0 l/ha

The spray programmes were as follows:

		Phase I		Phase II		Phase III	
Treatment code		Spray 1	Spray 2	Spray 1	Spray 2	Spray 1	Spray 2
	Growth phases	Shoots at 10-15 cm tall	+ 2 wks	In bud	1 day after picking	+ 3 wks	+ another 3 wks
1.	(control)	-	-	-	-	-	-
2.	I	Ron	Ron	-	-	-	-
3.	II	-	-	Fol	Fol	-	-
4.	III	-	-	-	-	Sca	Sca
5.	I+II	Ron	Ron	Fol	Fol	-	-
6.	I+III	Ron	Ron	-	-	Sca	Sca
7.	II+III	-	-	Fol	Fol	Sca	Sca
8.	I+II+III	Ron	Ron	Fol	Fol	Sca	Sca
9.	I+II+III	Fol	Fol	Fol	Fol	Fol	Fol

The same methods of spray application as described for 2000 were used, although sprays were applied in 250 litres/ha of water. The spray dates were 20 February, 9 March, 22 March, 30 March, 21 April and 11 May at Mepal, and 20 February, 14 March, 29 March, 9 April, 30 April and 21 May at Kirton.

Harvest and storage

Although in Project BOF 31b it was found that leaving flowers non-picked enhanced levels of neck rot, in combination with other pre-disposing factors, in the current trials the flowers were cropped, as this was a prerequisite of the LINK project protocol.

Because of the effects of different fungicide treatments on the rate of foliar senescence, the amount of foliage remaining at bulb lifting (mid-July 2000 and 2001) varied between plots. At harvest, any remaining foliage was flailed off mechanically and the bulbs were immediately lifted to the soil surface using a one-row bulb lifter. The bulbs from each plot were placed in net bags (about 25 kg each) and dried by fans in a shed at ambient temperatures. After 2-4 weeks, when bulbs were dry, they were cleaned on an inspection-cleaning-grading line. Two hundred medium-sized bulbs were selected at random from each plot, placed in net bags and stored on wooden trays in a controlled environment store (25°C and 80% RH) at HRI Kirton. These storage conditions were used to provide an environment conducive to the development of bulb rots (G.R. Hanks, personal communication).

Assessments

After storage for 5 weeks (2000) and 8 weeks (2001), all bulbs were bisected lengthwise and the incidence of each of the following types of bulb damage was recorded:

- Neck rot
- Basal rot
- Whole bulb rot (where it was not possible to distinguish a basal or neck origin)
- Other minor rots
- Damage due to narcissus fly larvae
- Damage due to bulb mites

Tissue from bulbs with damage typical of each rot type was plated onto potato dextrose agar amended with streptomycin sulphate, to determine the cause of rotting.

Experiment design and analysis

At each site in 2000, the trial comprised four replicate blocks of eight treatments arranged in a randomised block design with a double replication of the untreated control. In 2001, the trial comprised four replicate blocks of nine treatments with a single replication of the untreated control. At Mepal each plot was two ridges wide x 9 m long, and at Kirton three ridges wide x 8 m long, every plot having a guard ridge on either side. Data for whole rots and total rots in 2001 were subjected to analysis of variance in Genstat. However, due to the very low incidence of the other bulb rots in these trials, these data did not fulfil the assumptions of analysis of variance and were instead analysed using Friedman's test.

RESULTS AND DISCUSSION

2000

The incidence of neck rot did not exceed 4% for any individual treatment, despite the use of storage conditions that were considered conducive for disease development. The total incidence of rots (neck rot, basal rot, whole rot, other minor rots and damage due to narcissus fly larvae) was also low, with less than 5% of bulbs affected in individual treatments (Table 1). Despite longer green leaf area retention in the fungicide-treated plots, there was no significant effect of fungicide treatment at either site on the development of neck rot. Similarly, there was no effect of fungicide treatment on other individual types of bulb damage or total rotting.

Table 1. Percentage narcissus bulbs from two sites (2000) with different rot types after storage

Treatment	ADAS Arthur Rickwood				HRI Kirton			
	Basal rot	Neck rot	Whole rot	Total of rots[a]	Basal rot	Neck rot	Whole rot	Total of rots[a]
1. Control	0.9	1.8	0.1	2.8	1.8	0.3	0.1	2.3
2. Benlate DF	0.6	0.8	0.0	1.4	2.8	0.3	0.5	3.6
3. Ronilan FL	0.1	3.6	0.3	4.0	1.8	0.0	0.3	2.0
4. Bravo 500	0.6	1.5	0.0	2.1	3.3	0.0	0.6	4.0
5. Scala	0.5	1.8	0.1	2.4	0.9	0.0	0.3	1.3
6. Amistar	0.0	1.8	0.4	2.1	2.0	0.3	0.0	2.3
7. Folicur	0.4	2.6	0.0	3.1	2.5	0.4	0.0	2.9
8. Unix	0.6	2.9	0.1	3.6	3.3	0.0	0.3	3.5
Significance[b] (7 d.f.)	NS	NS	NS	NS	NS	NS	NS	NS
Mean	0.48	2.08	0.13	2.70	2.27	0.14	0.24	2.72

[a]Includes bulbs affected by narcissus fly larvae and other minor rots in addition to basal rot, neck rot and whole rot.
[b]According to Friedman's Test; NS = not significant

While the percentage of total rots was similar at both sites, it was apparent that the greatest proportion of rotting was due to neck rot at the Mepal site, and to basal rot at the Kirton site. It was also interesting to note that the incidence of damage due to narcissus fly larvae was slightly higher at Kirton, with 2.5% of bulb affected in the untreated control, compared with 0.1% at Mepal (data not shown).

Fusarium spp. were the only fungi isolated from bulbs with typical symptoms of basal rot at either site. In contrast, a range of fungi was isolated from bulbs with symptoms of neck rot. *Fusarium* sp. and *Penicillium* sp. were isolated from Kirton bulbs, while *Botrytis narcissicola* was isolated in addition to these species from Mepal bulbs. These results support previous reports indicating that neck rot is caused by a complex of pathogens rather than by one pathogen alone. The additional finding of *B. narcissicola* in bulbs from Mepal may be related to the greater incidence of neck rot at this site.

2001

The incidence of neck rot was very low in 2001, not exceeding 0.4% for any individual treatment (Table 2) at either site. Basal rot incidence was similar at both sites and corresponded to levels recorded in 2000. ‘Other rots’ recorded on bulbs from Mepal (<3 % for individual treatments) included rotting either in a position that was not associated with the neck or base, or that was indicative of a dead flower bud. There was no effect of fungicide programmes on these three individual types of bulb damage at either site, despite longer green leaf area retention for some fungicide programmes.

The incidence of whole rots (and correspondingly the total for all rot types) was markedly higher than in 2000, particularly in bulbs from Kirton (>10 % for some treatments). As for the other bulb rot types, there was no effect of fungicide treatment on the incidence of whole rots at Mepal. In contrast, there was a significant treatment effect at Kirton for total rots, reflecting the whole rot results. None of the fungicide treatments was significantly different from the untreated control, although treatments with a higher incidence of whole rot at Kirton coincided with fungicide programmes incorporating Folicur and for which a longer retention of green leaf area was recorded (Table 3).

Table 2. Percentage narcissus bulbs from two sites (2001) with different rot types after storage

Treatment	ADAS Arthur Rickwood					HRI Kirton			
	Basal rot	Neck rot	Whole rot	Other rots	Total of rots[a]	Basal rot	Neck rot	Whole rot	Total of rots[a]
1. Untreated	0.4	0.0	2.4	1.9	5.1	0.4	0.4	6.6	8.6
2. RR----	0.3	0.0	1.6	0.6	3.0	0.4	0.3	4.9	5.9
3. --FF--	0.3	0.0	2.0	2.3	4.5	0.5	0.0	11.4	12.6
4. ----SS	0.9	0.1	2.9	1.3	5.6	0.6	0.0	6.1	7.3
5. RRFF--	0.3	0.0	1.9	1.3	3.5	0.8	0.0	8.6	9.9
6. RR--SS	0.8	0.0	1.5	1.4	3.9	0.4	0.0	5.5	6.0
7. --FFSS	0.3	0.1	2.6	0.9	4.0	0.9	0.0	10.6	11.6
8. RRFFSS	0.6	0.1	4.1	2.3	7.1	1.4	0.0	11.4	12.9
9. FFFFFF	0.4	0.0	2.4	1.4	4.1	0.8	0.0	9.9	10.8
Significance[b] (8 d.f.)	NS	NS	NS	NS	NS	NS	NS	NS	*P*=0.045
SED	-	-	1.439	-	1.794	-	-	2.451	2.458
Mean	0.44	0.04	2.38	1.46	4.54	0.67	0.07	8.33	9.50

[a]Includes bulbs affected by narcissus fly larvae and other minor rots in addition to basal rot, neck rot and whole rot.
[b]According to Friedman’s Test for basal rot, neck rot and other rots; according to ANOVA for whole rot and total rots; NS = not significant

Similar low levels of damage (<0.7 %) due to narcissus fly larvae were recorded on bulbs from Mepal and Kirton. In addition, there was a low incidence of damage (0.6 % in untreated control) due to bulb mites on bulbs from Kirton, which was not observed on bulbs from Mepal, or for either sites in 2000.

Fusarium spp. were consistently isolated from Kirton bulbs with symptoms typical of neck rot, basal rot and whole rot, and *Penicillium* sp. was isolated from one bulb with whole rot. *Penicillium* spp. were isolated from all Mepal bulbs with neck rot symptoms, while *Fusarium* spp. were again isolated consistently from symptoms of basal, whole and 'other' rot. It was interesting to note that Fusarium was isolated from other areas of rot that had no obvious basal or neck connection. No *Botrytis* spp. were isolated irrespective of site or symptom type in 2001. Previous observations at this time of year at Kirton (G.R. Hanks, personal communication) suggest that, when neck rot is seen, it tends to be relatively localised within the neck area, whereas basal rot is likely to be seen in a variety of stages of development including spreading and extensive rots. These observations, together with consistent isolation of *Fusarium* spp. from bulbs with whole rot, suggest that the whole rot symptom is more likely to represent an advanced stage of basal rot rather than neck rot.

Table 3. Association of whole bulb rot with delayed die-back of foliage (2001)

	ADAS Arthur Rickwood		HRI Kirton	
Treatment	% die-back 22 June	% whole rot	% die-back 26 June	% whole rot
1. Untreated	100.0	2.4	100.0	6.6
2. RR----	100.0	1.6	99.9	4.9
3. --FF--	94.5	2.0	87.9	11.4
4. ----SS	94.7	2.9	97.6	6.1
5. RRFF--	94.8	1.9	80.1	8.6
6. RR--SS	93.6	1.5	96.1	5.5
7. --FFSS	12.3	2.6	69.1	10.6
8. RRFFSS	9.5	4.1	60.8	11.4
9. FFFFFF	1.8	2.4	68.9	9.9

In trial 1 (2000), the finding that the increased retention of green leaf area resulting from the use of fungicide sprays did not lead to an increase in the incidence of bulb rots was in apparent contrast to the findings of Project BOF 31b. However, the latter project involved the deliberate inoculation of narcissus plants with *Fusarium oxysporum* f.sp. *narcissi* in the period before bulb lifting, whereas in the current project only natural infection with neck rot pathogens was being considered. This suggests that fungicide sprays and green leaf retention are unlikely to enhance levels of neck rot under 'normal' conditions, although it is possible that under conditions of heavy pressure from pathogens this might, exceptionally, occur. This conclusion was supported by results in 2001, when neck rot was again unaffected by fungicide sprays and green leaf retention. The higher incidence at Kirton of whole rot (probably an advanced development of basal rot) reflects growers' observations that basal rot was generally severe in 2001 (G.R. Hanks, personal communication). It suggests that Kirton in particular was a high-risk site for the disease, compared with Mepal, due to environmental conditions and/or the widespread growing of narcissus in the immediate area. In such a situation of high inoculum pressure, there was a trend for increased incidence of whole rot to occur as a result of certain fungicide programmes and longer green leaf area retention, mirroring the results obtained when artificial inoculation of narcissus plants with *F. oxysporum* was considered.

CONCLUSIONS

The incidence of bulb rots that developed during storage was generally low (<5 %) for all treatments, with no effect from fungicide treatments applied during the growing season on the development of neck or other bulb rots during storage. The exception to this result was for Kirton bulbs in 2001, where under conditions of high inoculum pressure, there was a trend for a higher incidence of whole rot and rots in general for certain fungicide programmes, apparently coinciding with extended green leaf area retention.

The results from this project, combined with those of BOF 31b, indicate that where there is a high pressure from *Fusarium*, it would be advisable not to apply foliar fungicides (e.g. Folicur) which significantly delay die-back because of a possible increased risk of greater neck rot and/or whole bulb rot. However, in other situations, the results show it is probable that foliar fungicides, as used in this study, will not increase bulb rots. This information will help inform growers in deciding their fungicide spray programmes.

TECHNOLOGY TRANSFER

The progress of this project has been reported regularly at HDC BOF Panel meetings, and at meetings of the Horticulture LINK Project 188 consortium.

ACKNOWLEDGEMENTS

We are grateful to Mandy Shepherd and Lyndsey Rolfe (ADAS) and Pippa Hughes and Rodney Asher (HRI) for technical assistance.

APPENDIX 1

Crop diary

	1998-2000 trial	
Operation	**ADAS Arthur Rickwood**	**HRI Kirton**
Trial planted	1998	1998
Fungicide application	17/02/00	17/02/00
	13/03/00	10/03/00
	31/03/00	20/03/00
	19/04/00	31/03/00
	09/05/00	19/04/00
	20/05/00	22/05/00
Inoculation with *Botrytis narcissicola*	13/05/99	26/05/99
Assessments	08/02/00	09/02/00
	07/03/00	15/04/00
	13/04/00	16/05/00
	19/05/00	06/06/00
	02/06/00	19/06/00
		05/07/00
Bulbs lifted, put to dry	24/07/00	17/07/00
Bulbs cleaned and weighed	08-10/08/00	28/07 - 01/08/00
Bulbs put in 25°C store	11/08/00	02/08/00
Bulbs assessed for storage rots	14/09/00	06/09/00

	1999-2001 trial	
Operation	**ADAS Arthur Rickwood**	**HRI Kirton**
Trial planted	1999	1999
Fungicide application	20/02/01	20/02/01
	09/03/01	14/03/01
	22/03/01	29/03/01
	30/03/01	09/04/01
	21/04/01	30/04/01
	11/05/01	21/05/01
Assessments	19-20/03/01	04/04/01
	19-20/04/01	24/04/01
	08/06/01	07/06/01
	22/06/01	26/06/01
Bulbs lifted, put to dry	04-05/07/01	04/07/01
Bulbs cleaned and weighed	03-06/08/01	26/07/01
Bulbs put in 25°C store	08/08/01	28/07/01
Bulbs assessed for storage rots	02/10/01	26/09/01