

SEED SURVEY

for the Lincolnshire, Scotland and Humberside areas

Spring/Summer 1988

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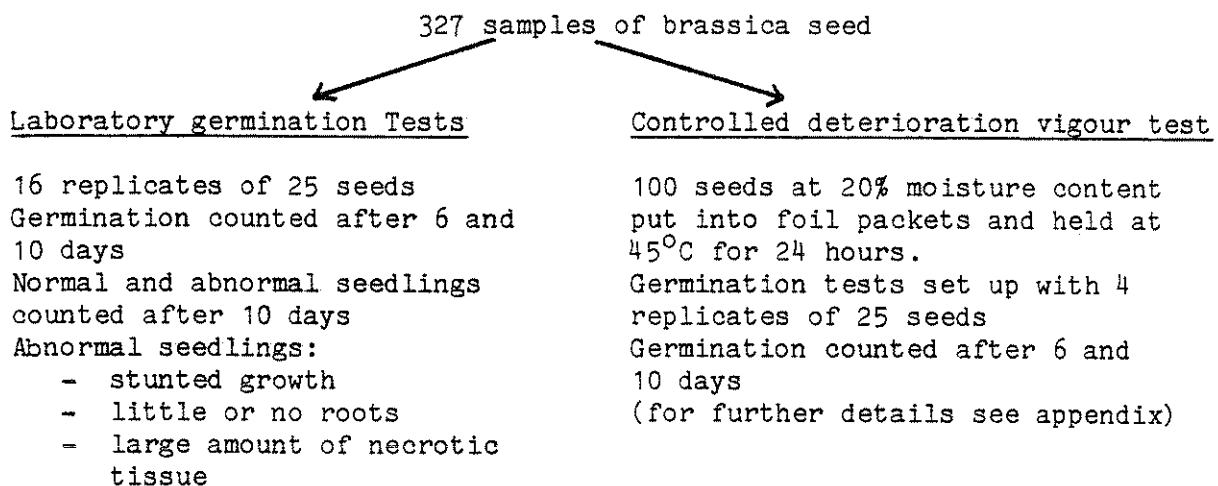
## SUMMARY

1. All except 2 of the 327 seed lots tested had high and commercially acceptable germinations, with more than 82% having over 90% germination.
2. The controlled deterioration (CD) vigour test revealed considerable differences in seed vigour. Germination after CD ranged from 100 down to 0%, the extent of the differences varying between species. Precision and superfrax seed tended to have higher vigour than non-precision seed.
3. The rate of emergence of selected seed lots in module trays was closely related to the vigour of the seed, as indicated by the CD germination. Seed lots with high CD germinations, and hence high vigour, emerged more rapidly and uniformly than seed lots with low CD germinations.

## INTRODUCTION

The aim of the survey was to assess the quality of brassica seed being used by growers in the spring/summer season of 1988. Samples of cabbage, Brussels Sprouts, cauliflower and calabrese were collected from propagators and processors in Lincolnshire, Scotland and Humberside. The germination and vigour was assessed on all seed lots along with the performance of selected samples in module trays.

## Method



## RESULTS

### (a) Germination tests

The germination tests showed that all but 2 of the seed lots tested had high and commercially acceptable germinations, that is over 70% (Table 1). Over 82% of the seed lots had over 90% germination. The spread of germinations was similar for the four species with the 2 low germinating lots both being cabbage varieties.

### (b) Vigour tests

The vigour test results revealed large differences in the vigour of the seed with CD germinations spread over a much wider range of germination categories (Table 1). The extent of the spread varied between species. For example, 60% of the cabbage seed lots tested had CD germinations of over 90% which is indicative of high vigour. The Brussels Sprouts, cauliflower and calabrese seed lots tested had 43, 41 and 42% in the over 90% CD germination category respectively. They therefore had fewer lots in the high vigour category with a correspondingly larger proportion of seed lots having lower seed vigour than did cabbage.

The results for each individual seed lot are presented in Tables 2-5. Vigour differences occurred within as well as between varieties. For example, the cauliflower variety Revito, with lots of different reference number, had CD germinations ranging from 53 up to 95%. Where the reference numbers were the same, suggesting that samples were from the same bulk lot, the CD germinations varied less, as for the cabbage variety Hermes which had CD germinations of 95 to 100% from 5 lots with the same reference number.

Precision and superfrax seed did not necessarily fall into the high vigour categories, but 62% of the lots known to be precision or superfrax had CD germinations of over 90% compared to only 36% of the seed lots marked non-precision (Table 6). Thus use of precision or superfrax seed would increase the chances of sowing high vigour seed.

### (c) Emergence in module trays

The rate of emergence of selected seed lots sown in module trays was assessed. The emergence rate was closely related to seed vigour, as indicated by the CD germination (Table 7). The higher the CD germination the faster and more uniformly the seed emerged. For example, on the first day after emergence began the Dutch cabbage cv Multiton with a CD germination of 95% had 72% emergence compared to only 14% for the lot Polinius having a 29% CD germination. The same pattern can be seen for the other species tested. In the case of Dutch cabbage, the slowly emerging low vigour lots eventually reached similar emergences to the high vigour lots. In contrast, the slowly emerging lots of red cabbage, cauliflower and Brussels sprouts had lower final levels of emergence.

**Table 1** The number of seedlots per germination category following laboratory germination and controlled deterioration tests

Germination Percentage	Frequency							
	Cabbage		Brussels Sprouts		Cauliflower		Calabrese	
	LG	CD	LG	CD	LG	CD	LG	CD
> 90	104	75	72	37	64	32	26	14
80-89	16	32	14	23	13	19	7	11
70-79	3	7	1	15	1	9	-	2
60-69	1	3	-	6	-	8	-	3
50-59	1	2	-	3	-	7	-	2
40-49	-	1	-	-	-	1	-	-
30-39	-	3	-	1	-	2	-	1
20-29	-	1	-	1	-	-	-	-
10-19	-	-	-	-	-	-	-	-
0-9	-	1	-	1	-	-	-	-

LG = laboratory germination  
 CD = controlled deterioration

**Table 6** Controlled deterioration germination of brassica seed which is not-precision, precision or superfrax

Germination Percentage	Frequency of CD germination		
	Not Precision	Precision	Superfrax
> 90	20	42	13
80-89	17	13	5
70-79	10	6	2
60-69	4	5	1
50-59	2	1	-
40-49	-	-	-
30-39	1	1	-
20-29	1	-	-
10-19	-	-	-
0-9	1	-	-



Table 2 (continued)

Rona	1	95.5	1.9	96	np
Roubin	1	95.7	1.9	84	np
Rovv	2	94.75	2.25	91	np
Ruby Ball	1	80.5	4	89	np
Saaria	1	94.75	2.75	85	p
Slaudena	1	94.5	0.75	91	np
Spittare	2	96.25	1.25	94	p
Stonplvad	5	97.6	2.75	94	np
Stonplvad	1	98.25	2.4	94	np
Stonplvad	6	98.25	1.5	96	np
Stonplvad	1	96.75	1.75	94	np
Stonplvad	1	98.75	0.5	100	np
Stonplvad	1	99.25	0.5	99	np
Stonplvad	1	95.5	2.5	90	np
Stonplvad	5	95.25	1.75	90	np
Stonplvad	3	96	3	95	np
Tajer	1	85	9.5	89	p
Tarvov	1	86.75	7.75	79	p
Tarvov	5	92.75	3	81	np
Tarvov	1	97	3	90	np
Tarvov	1	94	1.75	93	np
Tuutha	2	97.5	1.5	92	np
Volga	1	96.5	2	93	np
Winterdiker	1	84.25	5.5	91	np
Winterdiker	1	92.5	3.5	93	np
Winterdiker	1	94	2.5	92	np
Winterdiker	1	95.25	1.75	97	np
Winterdiker	1	91	3.25	94	np
Winterdiker	1	95.75	3	94	np
Winterdiker	1	93	6.25	99	np
Winterdiker	1	95	2	85	p

Table 3 Germination and controlled deterioration test results for 87 lots of Brussels Sprouts seed. Propagators indicated by numbers 1 to 14. Seed lots indicated by letters i.e. seed lots with same lot number have the same letter. u=reference number unknown. p=precision, np=not precision, ps=precision/superfrax

Variety	Propagator	Seed lot reference	Germination after 10 days		Controlled deterioration %
			Normal %	Abnormal %	
Adeline	1	a	97.75	1.75	91
	2	a	94.5	3.5	92
	3	a	96	2.75	94
	4	a	92.5	5.5	95
Aries	3	b	87.9	9.3	91
	5		97.25	1.5	87
	9	u	96.5	3.25	73
Asgard	4	a	97.25	2.25	94
	9		92	4.5	93
Boxer	1		89.7	7.6	64
	6		95.25	3	95
Cascade	4	a	95	3	95
	9		90.75	6.5	78
Cavalier	2	b	91	6.75	86
	4	c	91.75	5.75	88
Corvet	5	d	97.25	0.75	98
	8	e	93.75	3.75	95
Corvalent	2	a	92.75	7	94
	9	b	97	2	88
Dolmic	1	b	95.5	2.25	80
	2	a	96.75	1.5	83
Edmundo	1	a	96.75	2.5	78
	2	a	95.25	2.75	90
Fortress	4	a	96.75	2.5	93
	9	b	100	0	86
Gabion	6	c	92.4	3.6	85
	7	u	86.5	3	56
Golfer	4		81.25	0.25	71
	2		95.5	4	90
Igor	2		94.6	3	84
	5	a	100	0	-
Jackeline	6	b	88.5	4.25	60
	7	c	92.75	3	90
Largando	2		97.5	1.5	95
	6		91.5	6	77
Larvis	7		92.75	2.25	93
	1	a	97	1.25	84
Lunet	2		94	3.25	75
	7	b	96.5	0.75	87
Merlon	1	u	93.1	1.3	86
	7	u	95.25	2.75	83
Niz 84.368	2	a	88.25	6.5	54
	7		93.75	3.25	75
	2		96.25	3	92

Variety	Propagator	Seed lot reference	Germination after 10 days		Controlled deterioration %
			Normal %	Abnormal %	
Odessa	2	a	82.5	3.75	70
	2	a	95.75	2.25	91
	5	a	95.56	1.5	92
	5	b	95.75	1.75	96
Odliver	1	b	92.5	4.4	96
	3	b	93.5	2.25	95
	4	c	96	1	96
Omolink	7		93.75	4	68
	7	a	95.25	4.25	69
Oteloline	1	a	97.75	2	73
	3	a	91.5	8	76
Predora	4	a	94.6	5.4	-
	6	b	84.3	10.8	38
Rampart	7	a	87	5.75	80
	7	b	93.5	6.25	90
Richard	2	a	95	4.25	95
	4	a	95.75	4.25	92
Rasmunda	9	a	85.75	10	70
	6	b	97.6	8.8	-
Richard	1	u	93.5	5.5	92
	5	u	93.2	3.4	93
Robert	1	a	97.25	2	96
	4	a	98	1.75	100
Roger	1	a	93.75	3	85
	1	a	94.5	4.75	96
Snowden	2	b	96.25	2.75	87
	2	c	97.25	2	97
Stephen	4	d	84	10.75	71
	4	u	87	5.5	76
Stockade	5	u	90	3.25	80
	1	a	98	1	87
Talent	2	b	96.5	0.25	81
	1	a	93.6	2.3	85
Tardis	2		96.75	1.25	82
	3		87.88	3	92
Titirel	2		96.75	3	92
	3		93.7	3	57
Topaz	3	u	95.7	3.4	96
	8	a	97	2.25	95
Troika	1	a	94.75	2.25	70
	7	a	91.5	4.75	65
Walter	1	b	96	1.5	87
	1	u	74	15.3	63
Widgeon	6		87	3.75	29
	7	u	81.75	6.25	4
Zoras	2	a	96.5	1.75	76
	2	b	97.25	2.75	88





Table 5. Germination and controlled deterioration test results for 53 lots of Galapagos seed. Propagators indicated by numbers 1 to 14. Seed lots indicated by letters i.e. seed lots with same lot number have the same letter, i.e. reference number unknown. i.e. precision, np=not precision, ps=precision/superfrax

Variety	Propagator	Seed lot reference	Germination after 10 days		Controlled deterioration %
			Normal %	Abnormal %	
Citation Corvet	2		92.25	2	88
	3	a	97.5	2	88
	5	a	97.5	1.75	94
	9	a	99.5	0	98
	12	b	95.5	1.25	92
Cruiser	1	c	94	1.25	88
	9	u	96.75	1.25	92
	9	a	97	2	96
	9	b	95	2.75	94
	12	c	88.25	1.75	86
Green belt	1		95	4.5	90
	5	a	99.5	0.5	89
Hi-Crown	1	a	92.25	3.25	90
	5	a	92.75	1.5	88
Laser	5	a	100	0	89
	6	a	97.25	2.75	97
Marathon	1		97.25	2	97
	2	a	91.25	2.75	88
Marrakes	9	b	91.5	2	89
	9		89.75	1.75	88
Purple Capp	9		84	6.5	77
	9		83.5	6.25	38
Purple Conly	6		96.25	2	88
	1		93.5	2	90
RS 1	1	a	97.75	2.75	92
	6	b	88	3	66
RS 82437	1	a	94.25	3	75
	1	u	97.25	1.25	99
Samurai	1	a	85.5	5	69
	1	u	98.5	0.75	100
SG 1	1	a	95.75	2.5	100
	1	a	92.75	2.5	54
Shoqun	1	b	89.5	2.5	62
	2	b			np
Skiff	1	a			np
	1	a			np
Southern	1	a			np
	2	b			np
Comet	1	a			np
	2	b			np

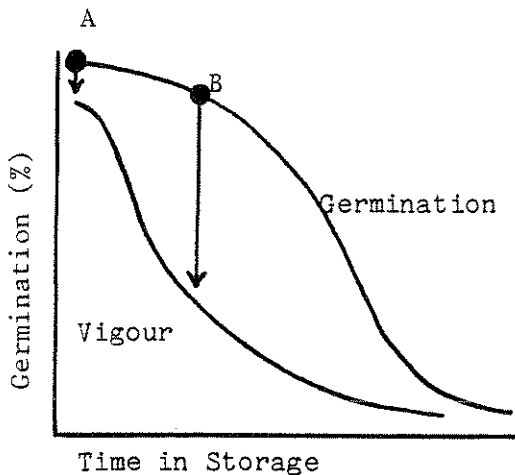
Table 7 Laboratory germination, germination after 24 hours controlled deterioration and percentage emergence on days 1 and 2 after emergence began and final emergence of 4 species of brassicas

Species/Variety	Emergence (%)				
	Lab Germ (%)	CD Germ (%)	Day 1	Day 2	Final
<u>Dutch Cabbage</u>					
Multiton	98	95	72	80	98
Davos	93	66	36	64	92
Polinius	83	29	14	28	90
<u>Red Cabbage</u>					
Red Rookie	97	97	60	90	98
Rodon	85	32	20	48	100
Preko	52	0	4	18	76
<u>Cauliflower</u>					
White Summer	98	99	18	80	89
Cambridge mid-Giant	88	69	4	51	85
Linda	81	55	6	52	81
King	90	37	1	18	78
<u>Brussels Sprouts</u>					
Richard	98	100	88	96	100
Edmundo	81	71	66	66	70
Tardis	100	57	64	86	100
Dolmic	87	56	66	86	92
Widgeon	87	29	36	74	88

## Appendix

### THE VIGOUR TEST

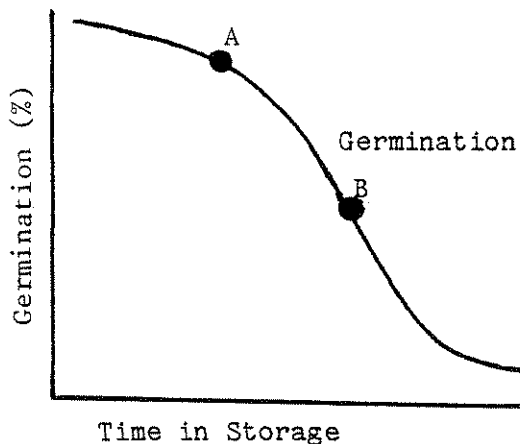
#### Before controlled deterioration



This graph illustrates the way in which seed germination changes during a period of storage. Initially germination falls slowly as time in storage progresses and then rapidly until the curve levels off again and very few seeds still germinate. During this time the vigour curve falls much more rapidly than germination. Two seedlots such as A and B which have very similar germinations will therefore have very different levels of vigour, A being a high vigour seedlot whilst B is a low vigour seedlot.

Some method is therefore required to differentiate between such high and low vigour seedlots since an ordinary germination test will not do so. The controlled deterioration test is one way in which this can be done.

#### After controlled deterioration:



Controlled deterioration ages seed by a given amount and therefore moves the germination of each seedlot along the germination curve. Seedlot A with an initially high germination and vigour will move along the curve due to ageing but the germination after the test remains high. However, seedlot B which was initially of high germination but low vigour will move over the shoulder of the germination curve as a result of ageing and have a much reduced germination after the test.

The germination of seed after controlled deterioration therefore gives an indication of where a seedlot lies along the initial part of the germination curve and hence whether it is of high or low vigour.