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EVALUATION OF NEW SOFT FRUIT VARIETIES

1. EVALUATION OF STRAWBERRY VARIETIES

1990-1994

FINAL REPORT

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1. RELEVANCE AND PRACTICAL APPLICATION

1.1 Application

Two June bearing selections have been named EM426, Emily and EM396, Laura for growers to use for early and protected crop and late season cropping respectively.

Evita is an outstanding everbearer with good fruit and agronomic qualities. Other everbearer varieties present some other useful characteristics especially the yield potential and early season of Tango.

1.2 Summary

These series of trials have shown the benefit of recycling the best selections from trials in future planting. Consistency of performance is thereby highlighted and rogue results due to seasonal effects are taken into account.

From the early selections in these trials, ES945 and EM426 were recommended for further evaluation. EM426 has subsequently been named Emily.

Selections which cropped in the midseason whilst not being generally outstanding did yield four worthy of further trial - EM235, EM319, ES1041 and EM284.

Some of the most interesting selections were late in season competing with Bogota or Pandora. Five were considered of sufficient merit for further trials evaluation - EM200, EM208, EM341, EM344 and EM396. The selection EM396 has been named Laura.

2.1 STRAWBERRY VARIETY TRIAL 37

2.1.1 INTRODUCTION

Breeding and variety testing of summer fruiting strawberries is continuing, with the object of introducing new good quality varieties, particularly to replace Elsanta with a good quality disease resistant variety. This trial tests a range of selections with this in mind.

2.1.2 MATERIALS AND METHODS

Module raised plants were planted at 1 m x 0.5 m on 12 August 1988. The treatments were replicated three times in a complete randomised block design with ten plants per plot.

TREATMENTS

Control (standards)	IHR East Malling Selections
Cambridge Favourite	EM20
Elsanta	EM22
Bogota	EM23
Gorella	EM29
	EM33
Belgian varieties	EM122
Manil	EM147
Kouril	ES945
	ES957
Canadian varieties	ES983
Annapolis	ES1040
	ES1043
US varieties	
Pajaro	

Only one replicate was recorded in 1990

2.1.3 RESULTS AND DISCUSSION

The named varieties Manil, Kouril, Pajaro and Annapolis did not crop well. Fruit of Kouril was soft and with a poor flavour but did crop late in the season although not at the level of Bogota.

Fruit was harvested on 22 July and assessed after 24 hours in cool (8°C) conditions. EM29 was soft with seedy orange flesh. Bogota had little flavour. Whilst having a strong flavour and a firm texture, EM122 was somewhat variable in appearance and colour. Kouril had no flavour and was very soft textured. Irregular shape and softness detracted from EM20 although flavour was good. Both EM33 and EM147 were firm fruited, EM147 being almost crunchy but with poor flavour.

The selection EM23 produced glossy red conical firm berries with easy calyx removal. Season was similar to Cambridge Favourite in the trial. It performed well in jamming tests (Appendix 2) and has potential as a dual purpose variety. Plant vigour is medium. susceptible to Verticillium Wilt. Yield similar to Elsanta with a similar fruit size distribution.

TABLE 1 -
MEAN CROP YIELD ((KG/10 PLANTS))

VARIETY	35+		25-35		18-25		TOTAL		CLASS II		UNMARKETABLE		TOTAL YIELD	
	1991	1989	1991	1989	1991	1989	1991	1989	1991	1989	1991	1989	1991	1989
EM23	1.70	2.00	3.10	5.03	0.61	0.15	5.41	7.19	0.18	0.96	3.50	1.09	9.09	9.24
ELSANTA	1.61	1.28	3.21	1.99	0.18	0.20	5.00	3.47	0.52	1.97	2.72	1.49	8.24	6.93
ES945	1.50	1.62	2.17	1.72	0.33	0.11	3.99	3.45	0.38	1.03	3.95	0.84	8.32	5.32
CAMBRIDGE FAVOURITE 3B	0.38	0.72	2.58	2.46	0.70	0.36	3.66	3.54	0.23	0.79	3.85	1.39	7.72	5.72
EM33	0.43	0.79	2.48	2.74	0.51	1.04	3.42	4.57	0.11	0.96	1.92	1.31	5.45	6.85
EM29	0.99	2.09	1.75	2.01	0.45	0.21	3.19	4.31	0.41	1.84	4.15	1.92	7.75	8.07
ES957	0.72	0.09	2.15	0.86	0.24	0.16	3.11	1.11	0.33	0.90	2.84	1.20	6.28	3.21
EM122	0.85	1.82	1.87	3.52	0.38	0.22	3.10	5.56	0.31	2.11	3.31	1.91	6.72	9.58
EM22	0.58	1.52	1.70	2.00	0.63	0.45	2.91	3.97	0.79	2.69	3.37	2.50	7.07	9.15
EM147	1.09	4.33	1.40	2.18	0.41	0.23	2.90	6.74	1.98	2.69	7.88	3.83	12.76	13.26
GORELLA	0.46	0.86	1.92	2.14	0.29	0.33	2.67	3.34	0.50	1.38	3.64	1.21	6.81	5.93
ES1040	0.45	0.93	1.70	2.11	0.39	0.38	2.54	3.42	0.09	0.86	2.31	1.26	4.94	5.54
ES983	0.32	0.59	1.05	1.59	0.28	0.27	1.65	2.45	0.11	0.57	0.89	0.68	2.65	3.69
EM20	0.17	1.47	0.97	2.05	0.26	0.20	1.40	3.72	0.25	2.36	3.12	2.78	4.77	8.86
BOGOTA	0.17	1.41	0.73	4.04	0.18	0.87	1.08	6.32	0.44	2.36	2.99	3.23	4.51	11.90
PAJARO	0.33	0.71	0.56	0.66	0.07	0.02	0.96	1.34	0.26	0.47	1.10	0.51	2.32	2.37
ES1043	0.18	0.71	0.49	1.90	0.06	0.26	0.73	2.86	0.11	1.42	0.89	1.60	1.73	5.88
ANNAPOLIS	0.10	0.21	0.41	0.25	0.11	0.04	0.62	0.50	0.10	0.47	0.79	0.58	1.51	1.55
KOURIL	0.08	1.52	0.43	0.78	0.08	0.10	0.59	2.40	0.18	1.36	2.36	5.42	3.13	9.18
MANIL	0.06	1.32	0.22	2.16	0.05	0.13	0.33	3.61	0.33	1.25	2.18	1.81	2.94	6.67

Multiply by 2.0 to convert to tonne/hectare

Table 2 - Mean Accumulated Crop Yield, Class I, Tonne/ha, 1989 and 1991

VARIETY	CLASS I (MM)			TOTAL
	35+	25-35	18-25	
EM23	7.4	16.3	1.5	25.2
EM147	10.8	7.2	1.3	19.3
EM122	5.3	10.8	1.2	17.3
ELSANTA	5.8	10.4	0.8	17.0
EM33	2.4	10.4	3.1	15.9
EM29	6.2	7.5	1.3	15.0
ES945	6.2	7.8	0.9	14.9
BOGOTA	3.2	9.5	2.1	14.8
CAMBRIDGE FAVOURITE 3B	2.2	10.1	2.1	14.4
EM22	4.2	7.4	2.2	13.8
GORELLA	2.6	8.1	1.2	11.9
ES1040	2.8	7.6	1.5	11.9
EM20	3.3	6.0	0.9	10.2
ES957	1.6	6.0	0.8	8.4
ES983	1.8	5.3	1.1	8.2
MANIL	2.8	4.8	0.4	8.0
ES1043	1.8	4.8	0.6	7.2
KOURIL	3.2	2.4	0.4	6.0
PAJARO	2.1	2.4	0.2	4.7
ANNAPOLIS	0.6	1.3	0.3	2.2

EM147 is a male sterile selection, four days later than Bogota in season and with a higher yield potential. Fruit shape is uneven, the fruit was also soft. Plant vigour medium.

The mid season selection EM122 has glossy orange/red tough skinned fruits. Fruit shape conical to round/conical. Early season fruit misshapen in 1989. Plant vigour medium. Its maiden crop was comparable to Elsanta but yield fell in the second and most noticeably third year.

An early season selection, ES945, has fruit size which was good in 1991 under difficult conditions. Berries glossy orange/red, conical to round conical firm with a tough skin. Plant vigour medium. Season and yield were comparable to Elsanta.

EM33 produced uneven orange to orange/red, conical berries, firm and with easy/moderate calyx removal. Acid flavour, fruit size and picking season similar to Cambridge Favourite. In preliminary jamming tests, EM33 was the lowest scoring selection, the jam was too pale.

TABLE 3 -
CROP YIELD (KG/10 PLANT) - 1990

VARIETY	CLASS I (MM)			TOTAL CLASS I
	LARGE 35+	MED 25-35	SMALL 18-25	
EM23	0.57	1.40	0.37	2.34
EM147	2.71	4.27	0.33	7.31
EM122	0.68	3.64	0.76	5.08
ELSANTA	0.92	3.34	0.98	5.24
EM33	0.16	2.73	1.42	4.31
EM29	1.34	3.57	0.42	5.33
ES945	0.18	2.70	0.71	3.59
BOGOTA	0.93	1.96	0.37	3.26
CAMBRIDGE FAVOURITE 3B	0.63	4.67	1.08	6.38
EM22	0.12	1.84	0.82	2.78
GORELLA	0.50	2.05	0.47	3.02
ES1040	0.64	3.82	0.93	5.39
EM20	0.13	0.95	0.23	1.31
ES957	0.13	0.95	0.23	1.31
ES988	0.94	1.90	0.71	3.55
MANIL	0.67	4.70	1.14	6.51
ES1043	0.26	1.82	0.21	2.29
KOURIL	0.05	0.48	0.16	0.69
PAJARO	0.07	0.78	0.32	1.17
ANNAPOLIS	0.18	0.25	0.05	0.48

FACTOR TONNES/HA = 2.0 (APPROX AS PLANT COUNTS NOT CARRIED OUT)

TABLE 4 -
MEAN HARVEST DATES

VARIETY	50%	FIRST	50%	LAST
	PICK 1989	PICK 1991	PICK 1991	PICK 1991
ANNAPOLIS	17.6	24.6	3.7	30.7
BOGOTA	5.7	28.6	21.7	2.8
CAMBRIDGE FAVOURITE 3B	26.6	24.6	7.7	30.7
ELSANTA	21.6	24.6	4.7	22.7
EM122	24.6	24.6	7.7	30.7
EM147	10.7	24.6	24.7	2.8
EM20	2.7	24.6	11.7	30.7
EM22	29.6	24.6	11.7	30.7
EM23	27.6	24.6	7.7	22.7
EM29	29.6	24.6	11.7	30.7
EM33	23.6	24.6	8.7	22.7
ES1040	23.6	24.6	6.7	30.7
ES1043	23.6	24.6	7.7	16.7
ES945	21.6	24.6	2.7	30.7
ES957	17.6	24.6	4.7	22.7
ES983	20.6	24.6	5.7	22.7
GORELLA	19.6	24.6	3.7	22.7
KOURIL	6.7	28.6	17.7	30.7
MANIL	27.6	24.6	10.7	27.7
PAJARO	23.6	24.6	4.7	22.7

TABLE 5 -
FLOWERING PERIODS 1991

VARIETY	FIRST FLOWER	FULL FLOWER	LAST FLOWER
ANNAPOLIS	24.4	6.5	26.5
BOGOTA	19.5	26.5	13.6
CAMBRIDGE FAVOURITE 3B	15.4	7.5	10.6
ELSANTA	29.4	14.5	8.6
EM122	23.4	19.5	8.6
EM147	19.5	30.5	15.6
EM20	7.5	16.5	8.6
EM22	25.4	18.5	7.6
EM23	5.5	16.5	8.6
EM29	26.4	14.5	10.6
EM33	13.5	23.5	7.6
ES1040	29.4	17.5	7.6
ES1043	11.5	19.5	7.6
ES945	23.4	12.5	5.6
ES957	26.4	18.5	9.6
ES983	11.5	25.5	5.6
GORELLA	29.4	20.5	7.6
KOURIL	21.5	30.5	13.6
MANIL	29.4	20.5	7.6
PAJARO	22.4	5.5	10.6

TABLE 6 -
POST HARVEST FRUIT ASSESSMENT - 1991

VARIETY	MEAN SCORE			
	APPEARANCE	COLOUR	TEXTURE	FLAVOUR
BOGOTA	4	4	4	5
EM122	4	3	5	6
EM147	4	4	4	3
EM20	4	4	4	5
EM29	4	4	4	5
EM33	5	4	5	4
KOURIL	3	3	2	1

EM147 had the outstanding crop level but the amount of large fruit decreased dramatically and unmarketable fruit increased in 1991. Its season is later than Bogota but flowers, like Pandora, are male sterile.

The support of HDC in funding this trial after MAFF closure of the National Fruit Trials ensured the trial was not terminated prematurely and data lost.

2.1.4 CONCLUSIONS

The results were discussed at the HDC Soft Fruit Committee meeting in November 1991. EM23 was eliminated as it is susceptible to Verticillium Wilt. Of the others, it was decided that ES945 should be looked at again at East Malling against new early fruiting selections. If this seedling performs well there, it should be re-submitted for trial at Brogdale.

Appendix I - Parentage and brief description of selections/varieties

- EM20 (ES407 (Redgauntlet x [Wiltguard x Gorella] x Tioga). Orange to orange/red berries, generally conical but shape irregular with many mis-shapes. Moderate firmness and calyx removal moderate/difficult. Four to six days later than Cambridge Favourite.
- EM22 (ES407 x Tioga). Orange to orange/red berries, conical with tendency to wedge, firm with a tough skin. Calyx removal is moderate/easy. Not very attractive for dessert market and performed poorly in processing tests. Three to four days later than Cambridge Favourite.
- EM23 (ES407 X Tioga). Attractive, glossy red, conical berries which are firm and calyx removal is easy/moderate. similar season to Cambridge Favourite. Performed well in processing tests and has potential as dual purpose variety. Susceptible to Verticillium Wilt.
- EM29 (ES407 x Tioga). Glossy orange/red to orange berries, conical to round/ conical in shape, large to medium sized and firm. Three to four days later than Cambridge Favourite.
- EM33 (ES407 x Tioga). Uneven orange to orange/red, conical berries, firm and with easy/moderate calyx removal. Acid flavour, fruit size and picking season similar to Cambridge Favourite. In one jamming test, the jam was too pale.
- EM122 (ES609 x Holiday). Glossy red, round to round/conical shaped berries which are firm with a tough skin. Medium fruit size; early season fruit misshapen in 1989. Similar season to Cambridge Favourite.
- EM147 (Pandora x Bogota). Large, pale orange/red, conical berries but many mis-shapen due to poor pollination (EM14-7 is male sterile). Deeply sunken achenes on well pollinated berries. Tendency to be soft with a weak skin. Very late season, three to five days after Bogota in the trial.
- ES945 (Gorella x Holiday). Large glossy, orange/red, conical to round/conical berries which are very firm with a tough skin. Very similar to Elsanta in appearance and quality but also apparently disease susceptible. Five days earlier than Cambridge Favourite.
- ES957 (Hapil x Titan). Orange/red round/conical shaped berries of moderate firmness with a medium/weak skin. Yields low. Early season, especially as a maiden.
- ES983 (ES407 x Cardinal). Orange/red, round/conical to conical shaped berries but with many mis-shapes early in season. Berries are firm with a tough skin but yields were low in trial.
- ES1043 Lower yielding, mid-season selection. Lower yielding mid-season selection.
- Annapolis ([Micmac x Raritan] x Earliglow). Round/conical shaped, red berries which are firm with a tough skin. Reported to be resistant to red core disease but yields were exceptionally low in trial and has not potential in the UK.
- Kouril (Gorella x [Cambridge Favourite x Deutsch Evern]). Uneven orange/red coloured, conical to long conical shaped berries which are relatively soft with a delicate skin. Fruit size is good but low yield of Class I fruit due to a high proportion of unmarketable fruit. Late similar season to Bogota.
- Manil ([Cambridge Favourite x Senga 142] x [Silet x Madame Moutat]). Unattractive, medium/soft, round/conical shaped berries of moderate size. Unlikely to have commercial potential.
- Pajaro (63..7-101 x Sequoia). Regular conical shaped berries which are very firm with a tough skin. Yield in trial, however, was very low and it is unlikely to have potential in the UK.

Appendix 2 - Processing trials for jam production - 1989/90

Strawberry Conserve was made using 9 different varieties of strawberry following the Tiptree Strawberry Conserve recipe, by Wilkin and son from fruit supplied from trials grown in 1989.

Standard total solids and pH measurements were taken for each one. Jam was made using a standard hand boiling method. Jams more than assessed by the Wilkin and Son taste panel.

Results:

Table 1 - Total Soluble Solids and Acidity

Strawberry Varieties	TSS%	pH
1. Rhapsody	70.7	3.40
2. Melody (71WC64)	67.8	3.50
3. ES1040	71.8	3.65
4. ES1043	70.6	3.60
5. Polka	70.4	3.51
6. EM33	76.3	3.49
7. EM22	69.1	3.70
8. EM23	71.4	3.60
9. 69GU76	71.8	3.70

This compared with a typical reading for standard Tiptree Strawberry of 69% TSS and pH 3.33

Each sample was then numbered and sampled as a blind test for texture, flavour and overall acceptability

Table 2 - Taste Panel Assessments

	Overall Scores				Average	Ranking
	A	B	C	D		
1	+4	0	-1	+1	+1	3
2	-1	4	+2	+4	+2.25	2
3	0	-3	-7	-1	-2.75	7
4	+1	-2	-2	0	-0.75	5
5	+3	-3	-1	-1	-0.5	4
6	-5	-5	-7	-2	-4.75	9
7	-7	-3	-7	-1	-4.5	8
8	+2	+2	+3	+4	+2.75	1
9	-5	0	+2	-4	-1.75	6

General Acceptability

EM33 and EM22 were given the lowest score. EM33 was considered too pale and EM22 was too hard.

Testers all moderately liked Rhapsody, Melody and 69GU76

EM23 was given the best total score

Texture

None of the fruits were considered to have a very good texture, some of this is partly due to the hand boiling method used which is not 100% consistent.

Rhapsody had a very firm texture whereas EM22 and EM33 were both very slack. Melody, Polka and EM23 had acceptable textures. Rhapsody was liked by one tester who liked firm preserves.

Flavour

EM23 was considered the best for flavour

ES1040 scored the worst

Conclusion

In fairness, this was not a good test for EM33 and EM22 because they were not set. However, a good indication of fruit colour and wholeness was achieved. 69GU76, Melody and Rhapsody were too dark, whereas EM33 was too light. Rhapsody was considered a little soft in texture and ES1040, Polka and 69GU76 were firm.

Finally, it must be remembered that these fruits were used individually and were hand made and filled, when considered as a blend they may be more suitable. Firm characteristics could be better for withstanding mechanical filling methods and still producing a whole fruit product. Light and dark coloured fruits could blend to produce the ideal colour preserve.

2.2 STRAWBERRY VARIETY TRIAL 40

2.2.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to complement or replace Elsanta, upon which the UK strawberry industry has become increasingly dependant.

2.2.2 MATERIALS AND METHODS

The plants were raised from mist propagated tips and planted on 13 August 1991 on the flat in single rows at a spacing of 1m x 0.5m. There was no soil sterilisation. There were three replicates each of twelve plants planted in a complete randomised block design. Trickle irrigation was installed after flowering in 1992

Treatments

Standards/Controls	EM223	EM271
Elsanta	EM224	EM208
Cambridge Favourite	EM255	EM317
Honeoye	EM209	ES969
Hapil	EM235	ES1041
Bogota	EM294	195L12
	EM237	EM258
	EM319	
	EM321	

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment.

2.2.3 RESULTS AND DISCUSSION

In 1992, the season was very early with first fruit picked on 2 June. Hot weather continued resulting in a much condensed picking season. The land on which trial was planted had not been fumigated prior to planting and obvious signs of *Verticillium* infection could be seen towards the end of the 1992 season. Most selections were affected to some extent but EM223, EM271, EM317 and 195L12 were very susceptible (similar to Hapil) whilst EM258 and EM294 were tolerant (similar to Cambridge Favourite).

Vigour assessments show ES1041 to be particularly strong growing. Honeoye plants were the least vigorous in Spring 1992. *Verticillium* Wilt infection was well established on this site by Spring 1993. The aphid assessment made during Spring 1993 showed EM294 and EM237 to be most susceptible.

Selections thought of interest in 1992 were the mid-season EM235, EM319, ES1041 and EM208. Fruit size was smaller in 1993. Of the heavier yielding selections, EM224 had the largest fruit. EM224 performed well over the two year period. The mid-season selection EM284 yielded most large and medium Class I fruit over the two year period. Late season selections cropping well included EM258.

Guard plots included the mid season variety Marmolada from Italy and Avanta from the Netherlands. These were only recorded in 1993. Marmolada performed well.

TABLE 7 - MEAN CROP YIELDS (G/PLANT) AND HARVEST DATE - 1992-1993

VARIETY	1992		1993		SMALL	1992+1993		CLASS II	UNMARKETABLE TOTAL	YIELD	50% PICK DATE		
	LARGE	MEDIUM	LARGE	MEDIUM		SMALL	TOTAL				1992	1993	
EM224	249	79	328	331	458	786	34	105	148	469	13/6	18/6	
EM255	271	135	406	288	378	784	80	78	187	543	17/6	1/6	
EM258	187	154	341	394	435	776	106	169	218	527	20/6	28/6	
ES1041	248	160	408	343	361	769	135	31	150	577	15/6	21/6	
EM290	182	133	315	392	447	762	94	32	262	536	15/6	21/6	
EM235	158	226	384	285	306	691	105	47	97	512	16/6	19/6	
EM294	282	137	419	211	247	666	69	102	276	663	15/6	22/6	
ELSAITA	306	107	413	218	245	658	59	88	166	579	15/6	21/6	
EM237	199	74	273	262	383	656	36	48	216	431	16/6	21/6	
CAM FAV	147	124	271	325	364	635	155	47	313	493	16/6	23/6	
EM319	263	128	391	221	242	633	80	111	142	599	15/6	23/6	
EM271	189	91	280	277	351	631	55	40	169	424	15/6	18/6	
EM288	210	68	278	220	297	575	91	39	180	449	22/6	28/6	
EM317	174	53	227	235	345	572	55	52	84	333	15/6	20/6	
ES969	221	163	384	155	181	565	89	68	110	522	13/6	22/6	
EM321	262	43	305	164	229	534	34	111	189	491	18/6	26/6	
HONEOYE	167	108	275	215	251	526	62	44	114	421	9/6	15/6	
HAPIL	188	101	289	106	172	461	24	36	152	515	16/6	19/6	
BOGOTA	171	83	254	179	198	452	118	109	266	606	25/6	3/7	
195LJ2	37	149	186	122	126	312	130	70	111	421	12/6	19/6	
EM223	124	37	161	79	129	290	11	45	92	377	13/6	17/6	
GUARDOS													
MARMOADA				454	512			225	338		1128	22/6	
AVANTA				319	430			105	354		944	17/6	

TABLE 8 FRUIT QUALITY AND SHELF LIFE ASSESSMENTS - 1992

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX
EM224		6	6	6	5/6/7
EM290	6/5	6/5	7/6	6/5	6/7
EM258		5	6	7/6	5
EM237	6/7	7/5	7	6/5	7/6
EM255		6	5	6/5	5
C FAVOURITE		5	5/4	5	4
ES1041	6/7	6/7	7	4	5
EM271		6	6	7	5
EM317	6/5		6	7	6/5
EM235	6/7		6	7	5/6
EM208		6	6	7	6
HONEOYE	5/6	5/4	5/6	6	6/7
EM294	5/6	5/6	6/7	6	5/4
ELSANTA		6	7	6/7	7/6
EM319		6	6/7	7/8	5
EM321		5	6/5	7	5
BOGOTA	4/5		4	5/6	5
ES969		5	5	6	3/4
HAPIL		5	5	5/6	4/5
EM223		5	5/6	6	4/5
195L12	6/5		4	5/6	5/4
				6/7	4

TABLE 9 - FRUIT QUALITY AND SHELF LIFE ASSESSMENTS - 1993

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX
EM224	6.3	6.3	5	5	5.3
EM290	6.3	5.3	6.7	5.7	5.7
EM258	6	5	7	5	5
EM237	5.3	5	5	5	4.7
EM255	5.7	6.3	5	5.3	5
C FAVOURITE	4.3	3.7*	3.3	4.7*	3
ES1041	6	7.7	8	6.7	7
EM271	6.3	6.7	6.3	5.3	5.7
EM317	5.7	6.3	6.3	5.7	5.7
EM235	6.3	6.7	7	5.7	6.3
EM208	6	6	4.3	4.7	4
HONEOYE	7	5.3*	5	5.3	5.7
EM294	4.3	5	5.7	5	3.3
ELSANTA	5.3	6	6	5.3	4.7
EM319	5.7	6.3	6.7	5	5.7
EM321	5	5.3	6.3	5	5
BOGOTA	4.3	3.3*	3.7	4.7	2.7
ES969	5	5.7	5.3	6.7	5
HAPIL	5	4	3.5	4.5	3.5
EM223	5.3	6	6.3	6.7	5
195L12	5	5.3*	6.7	6.7	5
GUARDS					
MARMOLADA	6	6	7	4	5
AVANTA	5	3	4	5	3

* LOW SCORES WHEN ASSESSED IN 1992

SCORES ARE MEANS FOR THE THREE PLOTS OVER THE WHOLE SEASON

1 = LOWEST SCORE, 9 = HIGHEST SCORE

SHELF LIFE TESTS WERE COMPLETED IN A SHADED ROOM AT AMBIENT TEMPERATURE

THE FRUIT WAS RECORDED FOR A 48 HOUR PERIOD AFTER PACKING

Quality assessments are given in Table 8 and 9. Selections already thought to have some merit, which performed well, included EM224, ES1041, EM235 and EM319. The shelf life of EM258, EM284 and Marmolada was poor. EM208 fruit was soft in 1993 and shelf life was poor. EM407 fruit did not score well on selection index. Fruit of these selections rapidly darkened in shelf life tests. EM227 generally performed poorly.

TABLE 10 - FLOWERING AND ANTHHER QUALITY 1992 AND 1993

VARIETY	FULL FLOWER	ANTHER QUALITY	FULL FLOWER	ANTHER QUALITY
EM224	16/5	4	9/5	3
EM290	17/5	3	14/5	3
EM258	13/5	1	14/5	0
EM237	15/5	2	4/5	2
EM255	18/5	3	14/5	4
C FAVOURITE	14/5	3	8/5	3
ES1041	15/5	2	14/5	2
EM271	18/5	2	14/5	4
EM317	18/5	3	8/5	4
EM235	12/5	5	5/5	3
EM208	21/5	5	16/5	5
HONEOYE	12/5	3	29/4	2
EM294	15/5	2	9/5	2
ELSANTA	16/5	3	10/5	3
EM319	17/5	2	14/5	1
EM321	20/5	2	14/5	2
BOGOTA	22/5	1	21/5	1
ES969	17/5	4	15/5	4
HAPIL	20/5	3	17/5	3
EM223	13/5	2	6/5	1
195L12	13/5	4	5/5	3
GUARDS				
MARMOLADA	-	-	14/5	3
AVANTA	-	-	7/5	3

KEY:

ANTHER QUALITY SCORE

1 = POOR

5 = VERY GOOD

TABLE 11 - VIGOUR, VERTICILLIUM WILT AND APHID ASSESSMENT

VARIETY	VIGOUR SPRING 1992	VERTICILLIUM SPRING 1993	APHID SPRING 1993
EM224	3.3	3.7	0.3
EM290	3	3.7	1
EM258	2.7	3.3	1
EM237	3.3	4	2
EM255	3.7	4	0.7
C FAVOURITE	3	4.7	0.7
ES1041	5	3.7	1
EM271	3	3.7	1.7
EM317	2.3	3	1
EM235	3	2.7	1.3
EM208	2.5	3	0.7
HONEOYE	2.2	3	1
EM294	3.8	2.7	2.3
ELSANTA	3	2.7	1.7
EM319	3.2	2.7	1.7
EM321	3	3.3	1.7
BOGOTA	2.5	3.3	0.7
ES969	3.7	3.3	1
HAPIL	3.5	2.3	1
EM223	2.5	2.3	1
195L12	3.7	3	1.7

KEY

VIGOUR

- 1 = VERY WEEAK
- 2 = WEAK
- 3 = MEDIUM
- 4 = VIGOROUS
- 5 = VERY VIGOROUS

VERTICILLIUM

- 1 = DEAD
- 2 = SEVERELY STUNTED
- 3 = SIGNIFICANT VIGOUR REDUCTION
- 4 = SOME OUTER LEAVES DEAD
- 5 = HEALTHY

MILDEW ON PLANTS

- 0 = ABSENT
- 1 = SLIGHT (BARELY VISIBLE)
- 2 = MODERATE
- 3 = SEVERE (LEAVES DISTORTED/NECROSIS)

2.2.4 Promising selections from this trial include the mid season selections EM235, EM319 and ES1041 plus the late season selection EM208. EM235 had a very low proportion of unmarketable fruit, with a similar season to Elsanta and good quality fruit (table 8) but lower yield and proportion of large fruit. EM319 also had good quality fruit which had firm flesh with comparable yield to Elsanta.

ES1041 had a high selection index and good fruit quality particularly in 1993 (table 9), yield was similar to Elsanta. Of interest, owing to its late season, was EM200, 3 days before Bogota which it out performed in terms of yield, fruit size and fruit quality in both years.

These four selections were proposed for inclusion in grower trials and for recycling in future replicated trials.

STRAWBERRY VARIETY TRIAL 40 - VARIETY NOTES

- EM294 (Providence x Etna) - brownish tinge: some ribbing with pitted achenes gives a coarse appearance: skin firmness suspect. Season similar to Elsanta, poor anther quality, tolerant to wilt
- ES1041 Season with Elsanta. Glossy fruit with good shape but can be lumpy: it has a meaty texture and a perfumed flavour. Vigorous leafy plant. Trusses just below canopy. Some wilt resistance. Poor anther quality. Shelf life good. Firm fruit skin and flesh
- EM255 (Providence x BC76-007-20) - bright, orange/red fruit but looks and feels a little spongy: skin firmness suspect
- EM319 (LA923 x Elsanta) - glossy fruit but with a pitted and lumpy appearance: uneven ripening: it has a crisp texture with an acid flavour. Vigorous open plant. Trusses level with canopy, poor anther quality, variable shelf life
- EM235 (LA915 x Honeoye) - bright and glossy fruit with a good shape: it may go too dark after picking: pleasant flavour. Moderate vigour. Variable shelf life performance
- ES969 Glossy fruit but has a pitted and lumpy appearance: it darkens quickly and skin firmness suspect
- EM258 (Rapella x Selva) - glossy but a little pale: early fruit misshapen but later very uniform: generally improved throughout the season. This selection also produces a second flush of fruit in late August. Vigorous plant, very poor anther quality. Tolerant to wilt. Season 7d later than Elsanta. High yields but shelf life poor
- EM224 (Honeoye x Hapil) - glossy fruit with good shape: can feel a little spongy: skin firmness suspect in hot weather: sometimes plugs. Flattish medium vigorous plant. Trusses below canopy, very few aphids. Good shelf life. Early condensed season good yield
-
- EM290 (Providence by Etna) - glossy fruit but lumpy and pitted appearance makes it look coarse: also looks spongy but skin is tough. Moderate plant vigour, some 'wilt' resistance/tolerance. Good yield potential, season as Elsanta, firm
- EM321 (LA407 x 79RN59) - dullish red/brown fruit with a blotchy appearance: meaty texture. Good selection index score. Season between Elsanta and Bogota. Yield poorer than Elsanta but better than Bogota
- EM271 (Gea x LA866) - bright and glossy fruit but a little seedy: puckered nose can lead to a white tip. Moderate plant vigour. Susceptible to wilt. Season 2 days after Honeoye with comparable yield but larger fruit and better second year crop.
- EM237 (Pegasus x JILA 67) - bright and glossy fruit can be ribbed and lumpy: good texture. Season as Elsanta but poorer maiden crop and less firm
- EM208 (Pegasus x Bogota) - bright but a little seedy: very regular shape: some uneven ripening. Moderate vigour, compact plant trusses level with canopy. Season 7d after Elsanta but before Bogota. Good fruit quality in 1992 but poor scores in 1993. Very good anther quality.
- EM317 (LA923 x Elsanta) - glossy and shape was very uniform after some early misshapes: a little seedy: odd perfumed flavour when fully ripe: good texture. Moderate vigour. Variable shelf life performance. Susceptible to wilt. Good fruit quality scores in both years of trial. Elsanta season but poor yield potential as a maiden
- 195L12 Dark but glossy (similar to Honeoye): soft skin: good flavour. 3d before Elsanta: poor yield

EM223 (Hapil x Douglas) - dull and seedy: darkens when fully ripe. Susceptible to wilt. Early 2d after Honeoye but much inferior yield. Very poor anther quality

Elsanta Started off as very attractive, well shaped fruit but suddenly became very seedy, ribbed with a green nose: appearance gradually improved towards the end of the season. Moderate plant vigour.

Honeoye Glossy but pitted: weak skin: darkens quickly. Early season with reasonable good yield and fruit quality

Bogota Very ribbed, pitted and misshapen initially but shape improved later in the season; felt spongy and has a weak skin. Moderate plant vigour. Poor anther quality. Poor shelf life - late

Marmolada Moderately vigorous plant, very spreading, many flower trusses with fruit just above canopy. Good fruit quality, firm but poorer flavour score than Elsanta. Very good yield potential for a similar season to Elsanta

Avanta Vigorous, flattish plant, fairly open - 'up cupped' leaf look like mildew infection. Trusses below canopy. Poor fruit quality

2.3 STRAWBERRY VARIETY TRIAL 41

2.3.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to complement or replace Elsanta, upon which the UK strawberry industry has become increasingly dependant. Equally valuable would be varieties to extend the natural fruiting season.

2.3.2 MATERIALS AND METHODS

The plants were raised from mist propagated tips and planted on 13 August 1991 on the flat in single rows at a spacing of 1m x 0.5m. Three replicates of 5 plant plots were planted in a complete randomised block design. Trickle irrigation was installed after flowering in 1992.

Treatments

Standards/Controls

Elsanta	EN284	EM407
Honeoye	EM200	ES934
Bogota	EM227	ES990
	EM99	

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment.

2.3.3 RESULTS AND DISCUSSION

1992 was a very early season with the first fruit picked on 2 June and the hot weather continued having the effect of producing a condensed picking season.

The second crop in 1993 was characterised by malformed fruit on most varieties except ES990, EM99 and ES934.

EM284 (Providence x Etna) mid season, glossy berry which can be seedy and ribbed, especially early in the season. Very high yield potential and good size distribution. Poor shelf life in these tests. Possible candidate for grower trials.

EM407 (EM152 x EM14) early primary fruits very ribbed and 'blotchy'. Male sterile flowers. Late season with good yield and dark coloured fruit.

EM200 (Pegasus x Pandora) late mid season, 6 to 7 days after Elsanta. Yield comparable to Elsanta, glossy berry, fruit darkens when fully ripe and in shelf life tests darkened rapidly. Small fruit size in second year. Some resistance to verticillium wilt. Moderately vigorous, compact plant with short trusses.

EM227 (Honeoye x Hapil) early season, a day or two before Elsanta and after Honeoye, in 50% picked date. Yield and fruit quality slightly inferior to Elsanta. Poor shelf life. Moderate vigour, 'flattish' growth to plant and short flower trusses. Very susceptible to aphid.

ES990 early mid season to inferior yield to Honeoye. Poor in fruit appearance, 'seedy' with prominent white nose and prominent calyx. Mealy texture. Very susceptible to aphid.

TABLE 12 - 1992 AND 1993 YIELDS IN GRAMMES PLANT 50% PICK DATE

VARIETY	LARGE	MEDIUM	TOTAL	LARGE	MEDIUM	TOTAL	1992+1993 TOTAL	SMALL 1992+1993	CLASS II 1993	UNMKTBLE 1993	TOTAL 1992	YIELD 1993	50% 1992	PICK 1993
EM284	358	225	583	75	458	533	1116	152	151	393	842	1215	15/6	23/6
EM407	318	84	402	64	281	345	747	41	294	351	811	1031	24/6	4/7
EM200	295	74	369	76	302	378	747	107	162	279	584	924	20/6	27/6
ELSANTA	232	77	309	77	342	419	728	70	133	237	431	856	13/6	21/6
HONEYE	201	71	272	64	334	398	670	70	71	179	390	713	8/6	14/6
ES934	162	63	225	155	235	390	615	75	107	232	399	803	15/6	24/6
EM227	203	130	333	20	189	209	542	13	162	232	526	613	12/6	19/6
ES990	263	50	313	85	105	190	503	10	62	175	435	437	13/6	19/6
EM99	80	98	178	59	239	298	476	89	44	268	351	688	12/6	21/6
BOGOTA	225	125	350	5	104	109	459	72	133	497	664	806	24/6	3/7

TABLE 13 STRAWBERRY VARIETY TRIAL 41
 FRUIT QUALITY ASSESSMENTS - 1992

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX
EM284	6/5	6/5	7	5/6	5/6/7
EM407	5/6	6	6	5	4/5
EM200	5	5/6	6/7	5/6	5
BOGOTA	5	4/5	5/6	5	3/4
EM227	6	5/6	5/6	5	5/6
ES990	6	6	6/7	5/6/7	6
ELSANTA	6	7/6	7	7/6	6/7
HONEOYE	6/5	5	5/6	6/5	5
ES934	6	6/5	6	5	6/7
EM99	5/6	4/5	6	6/5	4/5

TABLE 14 - FRUIT QUALITY ASSESSMENTS AT PICKING 1993

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX	SHELF LIFE
EM284	4.7	5.0	5.3	4.7	4.3	BOTRYTIS
EM407	4.7	6.0	6.0	4.0	4.3	VERY DARK
EM200	5.3	5.7	5.3	5.7	4.7	VERY DARK
ELSANTA	5.0	6.7	6.3	6.0	5.0	GOOD
HONEOYE	6.7	5.7	5.7	5.3	6.0	
ES934	5.7	5.0	5.3	6.0	4.7	BOTRYTIS
EM227	4.3	4.3	5.0	5.0	4.0	SOFT PATCHES
ES990	4.0	5.5	6.0	6.0	4.0	BOTRYTIS
EM99	5.7	4.0	5.0	4.3	4.7	SOFT PATCHES
BOGOTA	4.7	3.0	3.3	5.3	3.3	

SCORES ARE MEANS FOR THE THREE PLOTS OVER THE WHOLE SEASON
 1 = LOWEST SCORE, 9 = HIGHEST SCORE
 SHELF LIFE TESTS WERE COMPLETED IN A SHADED ROOM AT AMBIENT TEMPERATURE
 THE FRUIT WAS RECORDED FOR A 48 HOUR PERIOD AFTER PACKING

ES934 season very similar to Elsanta but inferior flavour and skin firmness although other fruit quality attributes are good. Good pollination characteristics.

EM99 (Providencee x Tioga) season similar to Elsanta but low yield and high proportion of unmarketable fruit. Berry is bright but pitted aches make it appear 'spongey'. Weak skin. Some tolerance to mildew but susceptible to verticillium wilt at East Malling.

DESCRIPTITONS OF FRUIT FROM SHELF LIFE TESTING - 1993

Fruit was placed in a shaded position in a room at ambient temperature (c 18°C) then held and recorded over a 48 hour period.

EM284 - two tests, started on 8 and 22 June. Fruit skin was weak and botrytis rotting a major problem in both tests

Elsanta - one test, started on 29 June. Fruit quality was still good, 48 hours from the beginning of the test.

EM407 - one test, started on 6 July. Fruit became very dark within 24 hours of the start of the test.

EM200 - one test, started on 22 June. Fruit darkened rapidly. The skin became very weak and the flesh soft, followed by botrytis rots

EM227 - one test started on 22 June. Weak skin, soft flesh and soft patches on the fruit surface, deveeloped within 48 hours.

ES990 - one test, started on 22 June. Fruit developed a dull dry appearance and was soft within 48 hours. Botrytis was also a problem.

TABLE 15 - VIGOUR ASSESSMENT SPRING 1992, VERTICILLIUM WILT AND APHID ASSESSMENT, SPRING 1993

VARIETY	VIGOUR	VERTICILLIUM	APHID
EM284	3.7	4.7	0.3
EM407	3.7	3.7	0.7
EM200	3.3	4.0	1.7
ELSANTA	2.7	3.3	0.3
HONEOYE	2.0	3.3	1.7
ES934	2.7	3.3	1.7
EM227	3.0	3.7	2.7
ES990	3.0	3.3	2.0
EM99	3.3	4.0	0.7
BOGOTA	3.0	4.0	1.3

KEY

VIGOUR

- 1 = VERY WEAK
- 2 = WEAK
- 3 = MEDIUM
- 4 = VIGOROUS
- 5 = VERY VIGOROUS

VERTICILLIUM

- 1 = DEAD
- 2 = SEVERELY STUNTED
- 3 = SIGNIFICANT VIGOUR REDUCTION
- 4 = SOME OUTER LEAVES DEAD
- 5 = HEALTHY

MILDEW ON PLANTS

- 0 = ABSEN
- 1 = SLIGHT (BARELY VISIBLE)
- 2 = MODERATE
- 3 = SEVERE (LEAVES DISTORTED/NECROSIS)

ES934 - one test started on 6 July. Flesh softened rapidly, soft patches developing on the fruit surface followed by botrytis rotting.

EM99 - one test started on 22 June. Weak skin, soft flesh and soft patches on the fruit surface, developed within 48 hours.

2.3.4 CONCLUSIONS

EM284 performed well as a mid season selection and despite some fruit quality problems was considered worthy of further evaluation. EM200 was also most interesting selection from this trial with a later 50% harvest date than Elsanta but some fruit quality problems. Other selections did not perform better than control varieties.

2.4 STRAWBERRY VARIETY TRIAL 42

2.4.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to complement or replace Elsanta, upon which the UK strawberry industry has become increasingly dependant. Varieties which could usefully extend the season of high quality as early or earlier than Honeoye or later than Elsanta would also be welcome.

2.4.2 MATERIALS AND METHODS

The plants were raised from mist propagated tips and planted on 14 August 1992 in methyl bormide fumigated land. Raised beds were created, each with a single line of trickle irrigatiton and black polyethylene mulch and planted wih plants spaced at 0.5m x 0.3m in double staggered rows. Bed centres were at 1.5m apart. A complete randomised block experimental design was used with three replicates of ten plant plots.

Treatments

Standards/Controls	From HRI East Malling	
Elsanta	EM415	EM200
Cambridge Favourite	EM341	EM426
Honeoye	EM284	EM316
Bogota	EM404	ES934
	EM396	EM216
	EM384	
Guards		
Cortina - Italy	Governor Simcoe - Canada	
Gundor - Wales	Settler - Canada	
Melody - SCRI	Marjoral - France	
Mamie - France		

Only the maiden crop in 1993 was recorded. Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment.

2.4.3 RESULTS AND DISCUSSION

Some selections with high yield potential and late season were evident in this trial. Selections yielding particularly heavily were the early EM426, mid season EM415 and the late EM200 and EM341. Fruit quality of EM200 was poor with a lot of malformed fruit with large amounts of unmarketable fruit.

Quality assessments given in Table 19 show that varieties and selections with all round satisfactory performance were EM341, EM426 (acid fruit), Honeoye, Elsanta, Governor Simcoe and Cortina. EM384 was perhaps the least flavoured.

EM200 and EM284, previously in Variety Trial 41 did not perform well in shelf life tests. However, EM284 scored well in other quality assessments.

Vigour assessments in Table 20, show EM341, Pandora, EM284 and Hapil to be particularly strong growing. Elsanta plants were the least vigorous in the trial. Assessment of Verticillium Wilt in this sterilised site showed all varieties and selections to be growing well, apart from Elsanta where some 'wilt' infection was suspected. Mildew susceptibility was recorded during Autumn 1993. Varieties and selections with least mildew susceptibility were EM426, EM284, EM404, EM396, Cortina and Mamie. Those with most mildew included Hapil, Elsanta, Gorella and Gundor.

Table 16 gives records of Blossom Weevil damage which affected the later flowering/fruiting strawberries. EM341 was most affected followed by EM404 which reached full flower within a day of Pandora and EM396. However, EM341 still cropped heavily. Both EM341 and EM404 produced a lot of pollen.

DESCRIPTIONS OF FRUIT FROM SHELF LIFE TESTING - 1993

Fruit was placed in a shaded position in a room at ambient temperature (c 18°C) then held and recorded over a 48 hour period.

EM284 - two tests, started on 16 and 29 June. Botrytis rotting and soft patches on the skin were the main problems

Elsanta - one test, started on 8 June. Fruit remained acceptable throughout the test, retaining firm skin and moderately firm flesh with few rots.

EM200 - one test, started on 29 June. Fruit darkened quickly and was soft.

ES934 - two tests started on 16 and 29 June. Botrytis rotting was a major problem.

EM415 - Two tests started on 16 and 29 June. Soft patches and Botrytis developed on fruit in both tests. Fruit colour became very dark in second test fruit.

EM341 - one test, started on 29 June. Appearance was generally good but the fruit colour became very dark

EM426 - one test started on 8 June. Fruit colour was dark at the start of the test but did not darken further. The flesh was firm at the start of testing but soft at the finish

Pegasus - one test, started on 16 June. Fruit became soft with dull patches on the skin.

Pandora - one test started 29 June. Pandora performed well remaining fairly firm with few rots.

Hapil - one test started on 16 June. Fruit was soft and botrytis rotting was a major problem

EM316 - two tests started on 22 and 29 June. Soft patches soon developed on the skin. Botrytis was also a problem

EM404 - one test started 29 June. The general appearance was not good, the fruit was also soft.

Honeye - one test started 8 June. Although the fruit was soft, no major problems developed and fruit appearance remained satisfactory

EM396 - one test started on 29 June. The fruit had a dry appearance and rapidly became very dark.

Cambridge Favourite - one test started on 16 June. Poor looking soft fruit developing brown patches on the skin and botrytis

EM216 - one test started on 16 June. Appearance deteriorated as soft patches developed on the skin.
Gorella - one test started on 8 June. Some rots had developed by the end of testing

EM384 - (LA1047 x EM17) midseason, low yield but very good flavour scores and other quality attributes good. Large leafy, upright plant with few flower trusses below foliage.

Governor Simcoe - one test started on 16 June. Fruit had firm skin and flesh and remained attractive throughout the period of testing

Gundor - one test started on 29 June. Fruit soft with a weak skin. Unattractive.

Cortina - one test started on 8 June. Fruit generally attractive retaining its quality throughout

Majoral - one test started on 16 June. Soft patches soon developed on the fruit

Mamie - Two tests, started 8 and 29 June. Unattractive, soft in the second test with soft patches on the skin

Melody - one test started on 22 June. Very dark, becoming dry and soft.

Table 16 - Blossom Weevil Damage to late Fruiting Selections - 1993

Variety	Mean Damage Score
EM341	3.0
EM404	2.3
Pandora	1.0
EM200	1.0
EM396	1.0

(30 June 1993)

Key 0 = Absent
1 = slight (one or two flowers removed)
2 = moderate
3 = severe (50% or more flowers removed)

Table 17 - Flowering and Anther Quality 1993

Variety	Date of Full Flower	Anther Quality Score
Elsanta	5/5	3
Hapil	14/5	4
EM316	21/5	4
EM396	24/5	5
EM341	21/5	5
EM934	15/5	1
EM200	16/5	2
EM284	7/5	1
EM404	25/5	5
EM415	15/5	4
EM216	7/5	3
EM426	29/4	3
EM384	15/5	5
Pegasus	8/5	3
C Favourite	4/5	3
Pandora	24/5	0
Honeoye	3/5	3
Bogota	17/5	2
Guards		
Majoral	31/4	2
Melody	4/5	5
Cortina	28/4	3
Settler	8/5	1
Gundor	14/5	1
Governor		
Simcoe	7/5	4

Anther Quality Score Key:

0 = anther absent
 1 = poor
 5 = very poor

Table 18 - 1993 Yields in grammes/plant 50% pick dates

Variety	Large	Medium	Total	Small	Class II	Umkmt	Total Yield	50% pick date
Elsanta	117	155	272	14	98	62	446	16/6
Hapil	288	121	409	5	154	272	840	18/6
EM316	273	124	397	5	52	215	669	23/6
EM396	151	159	310	6	110	254	680	1/7
EM341	258	315	573	39	82	239	931	3/7
EM934	247	133	380	14	60	155	609	19/6
EM200	280	320	600	74	213	393	1280	29/6
EM284	257	157	414	15	173	180	782	20/6
EM404	187	201	388	7	48	256	699	3/7
EM415	463	169	632	13	94	205	944	17/6
EM216	163	99	262	4	71	88	425	17/6
EM426	150	401	551	86	158	150	945	14/6
EM384	136	68	204	7	63	150	424	21/6
Pegasus	322	195	517	18	97	103	735	19/6
C Favourite	79	218	297	12	55	186	550	19/6
Pandora	69	431	500	64	122	216	902	4/7
Honeoye	202	109	311	9	38	23	381	9/6
Bogota	98	230	328	30	112	103	573	27/6
Gorella	70	185	255	27	89	67	438	11/6
Guards								
Mamie	41	174	215	157	18	63	453	13/6
Majoral	59	158	217	27	101	186	531	20/6
Melody		98	98	77	6	93	274	14/6
Cortina	62	207	269	7	23	51	350	9/6
Settler	7	68	75	2	77	72	226	17/6
Gundor	84	202	286	68	126	317	797	30/6
Governor								
Simcoe	103	194	297	10	49	86	442	16/6

Table 19 - 1993 Quality Assessments at Picking and Shelf Life Tests

Variety	Appearance	Skin Firmness	Flesh Firmness	Flavour	Selection Index	Shelf Life
Elsanta	6/6/6	7/7/7	7/7/6	6/6/5	6/6/6	Good
Hapil	5/5	6/5	4/5	5/5	4/5	Botrytis
EM316	6/8/7	5/5/7	6/7/7	6/8/6	6/7/7	Botrytis/soft
EM396	5/6/5	6/6/7	7/7/7	5/5/6	5/6/6	Dry/very dark
EM341	6/8/7	7/6/6	7/7/7	5/6/5	6/7/6	Good - darkened
EM934	6/6/7	6/6/6	6/6/7	6/6/7	6/6/7	Botrytis
EM200	6/5/6	6/5/5	5/5/5	5/6/5	5/5/4	Very dark/soft
EM284	6/7/6	7/7/7	7/7/8	7/6/7	6/7/6	Botrytis
EM404	7/8/6	6/4/5	7/6/6	6/6/5	6/6/5	Soft
EM415	7/6/6	6/6/6	6/6/7	5/5/6	6/6/6	Botrytis/dark
EM216	6/5/6	7/7/7	7/7/7	6/6/6	6/6/6	Soft patches
EM426	6/6/7	7/6/7	7/6/6	5/4/5	6/5/7	Satisfactory
EM384	6/6/5	6/6/6	6/6/7	7/7/7	6/7/5	Botrytis
Pegasus	7/6/6	7/6/6	6/6/6	5/5/5	6/6/5	Soft/dull patch
C Favourite	5/5/5	4/4/3	5/3/3	6/6/5	4/3/3	Botrytis/brown
Pandora	7/6/6	5/6/7	4/7/4	6/6/4	5/6/5	Good
Honeye	7/8/7	6/6/6	7/6/5	7/6/6	7/7/6	Satisfactory
Bogota	6	4	5	6	5	
Gorella	5/6	4/5	4/4	4/5	4/4	Rots
Guards						
Majoral	5	6	4	5	4	Soft patches
Melody	5	3	4	6	4	Dry/soft/dark
Cortina	7	5	6	6	6	Good
Settler	4	7	8	7	5	
Gundor	6	5	5	7	6	Soft/weak skin
Mamie	5	7	7	6	5	Soft patches
Governor						
Simcoe	5	6	6	6	5	Soft/weak skin.

Scores are means for each plot 1 = lowest score, 9 = highest score
 Shelf life tests were completed in a shaded room at ambient temperature. The fruit was recorded for a 48 hour period after picking

Table 20 - Vigour Assessment Spring 1993, Verticillium Wilt and Powdery Mildew Assessments, Autumn 1993

Variety	Vigour	Verticillium	Mildew
Elsanta	2.7	3.0	3.0
Hapil	5.0	4.5	3.0
EM316	4.3	5.0	1.3
EM396	3.3	4.3	0.3
EM341	5.0	5.0	2.0
EM934	3.7	5.0	0.7
EM200	4.7	5.0	1.3
EM284	5.0	4.0	0.3
EM404	4.3	4.7	0.0
EM415	4.3	4.7	2.3
EM216	3.0	4.3	2.3
EM426	4.7	4.7	0.0
EM384	4.7	4.7	1.0
Pegasus	3.7	4.0	2.7
C Favourite	4.0	5.0	1.0
Pandora	5.0	4.7	1.3
Honeoye	3.3	4.3	1.7
Bogota	3.0	4.0	1.0
Gorella	3.0	4.0	3.0
Guards			
Majoral	3.0	4.0	2.0
Melody	3.0	4.0	2.0
Cortina	3.0	4.0	0.0
Settler	4.0	5.0	0.0
Gundor	4.0	5.0	3.0
Mamie	3.0	5.0	0.0
Governor			
Simcoe	4.0	5.0	2.0

Key

Vigour

- 1 = very weak
- 2 = weak
- 3 = medium
- 4 = vigorous
- 5 = very vigorous

Verticillium

- 1 = dead
- 2 = severely stunted
- 3 = significant vigour reduction
- 4 = some outer leaves dead
- 5 = healthy

Mildew on plants

- 0 = absent
- 1 = slight (barely visible)
- 2 = moderate
- 3 = severe (leaves distorted/necrosis)

Descriptions of Selections:

EM284 - (Providence x Etna) midseason just after Hapil. Fruit quality good as firm or firmer than Elsanta with as good a flavour. Poor shelf life due to botrytis. Dense vigorous hairy plant. Trusses below canopy and some primaries malformed.

Elsanta - moderate vigour. Mildew. Upright open plants. Anther quality moderate. Trusses level with canopy. Shelf life good.

EM200 - (Pegasus x Pandora) very high yield potential but large amount unmarketable. Very vigorous. Blossom Weevil not a problem. Palnt, dense and upright. Trusses upright and beneath foliage. Anther quality poor. Poor shelf life, fruit colour becomes very dark and softens

ES934 - fairly upright, vigorous plant with leaves tending to flop over. Very long flower trusses.

EM415 - (LA976 x LA941) exceptionally high yield with good fruit quality. Vigorous upright strong looking plants. Anther quality good. Trusses below canopy. Shelf life moderate. Botrytis main problem. Flavour not as good as Elsanta.

EM341 - (EM75 x Kent) late as Pandora with high yield and good fruit quality. Very vigorous plants tending to flop. Trusses level with canopy. Mildew, Blossom Weevil a problem at HRI and BHT. Anther quality very good. Shelf life as good as Elsanta. A complete tray of fruit looks very green due to the large calyx.

EM426 - (Honeoye x Gea) very vigorous dense upright plants with many crowns. Anther quality moderate. Shelf life moderate. Trusses below foliage, some fruit malformation

Pegasus - good yield potential, midseason. Good fruit quality score but flavour score low. Large upright plant with crinkly leaves. Flower trusses level with canopy.

Pandora - good yield and shelf life proved to be as good as Elsanta but low proportion of large fruit. Very late season. Dense upright plant with trusses below foliage. Many small flowers

Hapil - one test started on 16 June. Fruit was soft and botrytis rotting was a major problem

EM316 - (WA919 x 79RN-59) good fruit quality and flavour. Vigorous. Dense vigorous plants. Anther quality good. Few trusses below foliage. Shelf life moderate - Botrytis

EM404 - (EM152 x EM86) - late as Pandora and yield just above Bogota. Vigorous. Moderate Blossom Weevil attack. Large upright dense plants. Anther quality very good. Trusses level with canopy. shelf life moderate. Large calyx.

Honeoye - moderate vigour. Plants sparse/upright short trusses. Anther quality moderate. Shelf life good.

EM396 - (EM147 x EM86) season between Bogota and Pandora but lower yield than EM341 and Bogota. Moderate vigour. Blossom Weevil not a problem. Compact leafy plant with trusses level or just below canopy. Anther quality very good. Shelf life poor; fruit rapidly darkens - too many misshapes.

Cambridge Favourite - midseason, very poor fruit quality scores. Vigorous dense upright plants. Some leaf scorch. Flower trusses upright but beneath foliage.

EM216 - (Providence x Selva) midseason but firm fruit, disappointingly low yield but high proportion of large fruit. Flattish plant with large leaves and short flower trusses. Not unlike Cambridge Favourite. Resistant to wilt.

Gorella - compact, upright plant with some leaf scorch and trusses level with foliage. Some malformation on primary fruit

EM384 - one test started on 29 June. Botrytis rotting was the main problem

Governor Simcoe - mid season, crops at similar level to C Favourite. Poor appearance to fruit. Good shelf life. Upright, vigorous medium density plants with short trusses

Gundor - late and medium crop level but very high proportion of unmarketable fruit. Good flavour. Medium vigour, compact plant with trusses to edge of plant.

Cortina - very early, with Honeoye, comparable yield to C Favourite but gives higher large fruit proportion. Good appearance. Produced small second crop in September. Good shelf life. Medium vigour, open plant with trusses below canopy

Majoral - low yield of late midseason fruit. Medium vigour and density, ragged plant with long trusses

Melody - low yield, most of fruit medium sized. Very soft flesh and skin to fruit. Produced small second crop in September. Medium vigour, open plant with trusses well displayed around outside of plant

Bogota - moderate vigour. Anther quality poor. Shelf life moderate.

Settler - Very low yield of midseason fruit. Good flavour and firm flesh and skin. Upright, fairly sparse, vigorous plant. Trusses below foliage. Fruit malformed.

2.4.4 CONCLUSIONS

EM284 is recommended for further evaluation trials and possible grower trials as a good all round midseason variety with high fruit quality. EM426 is suggested for trials under polythene tunnels due to being slightly earlier than Elsanta and with good fruit quality and shelf life, although somewhat poor flavoured in this trial.

EM341 was an exceptional late season selection with good fruit quality, shelf life and yield which could effectively cover the season for which Pandora was released. EM396 should also be evaluated further as a late season variety which is not as prone to blossom weevil as EM341 and having a more compact plant but in this trial lower yield potential and poorer shelf life. Both were, however, later in season and with better yield and fruit quality than Bogota. Further evaluation of EM415 is also suggested in view of its very high yield potential. EM316 may also be worth further evaluation as a late midseason selection.

2.5 STRAWBERRY VARIETY TRIAL 43

2.5.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to complement or replace Elsanta, upon which the UK strawberry industry has become increasingly dependant. The extension of the season to provide a continuity of British fruit is also an aim of evaluation and development work.

2.5.2 MATERIALS AND METHODS

This trial was planted to evaluate further selections contained within Variety Trial 42. All plants were raised from runner tips, rooted under mist in modules and planted 0.5m into double staggered rows on raised beds at 1.5m centers which were mulched with black poethylene film. One trick irrigation line was laid in the centre of each bed. Planting took place on 7 September 1992 and the maiden crop was recorded in 1993.

Treatments

Standards/Controls	From HRI East Malling	
Elsanta	EM415	EM200
Cambridge Favourite	EM341	EM426
Honeoye	EM284	EM316
Bogota	EM404	ES934
Pegasus	EM396	EM216
	EM384	ES990
Guards		
Cortina - Italy	Orion - New Zealand	
Darline - France	Daribelle - France	
Cavendish - Canada	Mamie - France	

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment. In this trial these tests were only completed on ES990, Orion, Darline and Cavendish which had not been evaluated in previous trials.

2.5.3 RESULTS AND DISCUSSION

Yields (g per plant) (table 21) were generally lower than in trial 42 from this planting date although the ranking was similar. EM396, a late season selection, did comparatively better in this trial but produced a large amount of malformed and unmarketable fruit and toward the end of cropping, fruit damaged by insects (not identified). EM341 and EM200, which cropped well in trial 42, produced most Class I fruit in trial 42. EM426 and EM384 were much earlier in their 50% pick date in this trial. ES990 which cropped for the first time in this trial had fruit with a large calyx and white shoulders, it was similar in season and cropping to Elsanta and whilst quite firm in skin and flesh had low scores for appearance. Orion and Cavendish had poor fruit appearance with Orion being particularly soft.

Vigour assessments are given in table 20. EM341, EM200 and EM404 were most vigorous. ES934, Bogota, EM216 and Honeoye were least vigorous. Verticillium wilt was suspected but not confirmed in Elsanta and Pegasus. Powdery mildew infection was greatest on EM415, Elsanta, Pegasus, EM384 and Cavendish.

Table 20 - Vigour Assessment Spring 1993, Verticillium Wilt and Powdery Mildew Assessments, Autumn 1993

Variety	Vigour	Verticillium	Mildew
Elsanta	3.0	3.0	3.0
EM316	3.0	5.0	1.0
EM396	3.5	4.5	0.0
EM341	4.5	4.0	1.5
EM934	2.5	5.0	0.0
EM200	4.0	4.5	0.0
EM284	3.0	4.5	0.0
EM404	4.5	4.5	0.0
EM415	3.0	4.5	2.0
EM216	2.5	4.0	1.5
EM426	3.0	5.0	0.5
EM384	3.0	4.5	2.5
Pegasus	3.0	3.5	2.0
C Favourite	3.5	4.0	0.5
Honeye	2.5	4.5	1.5
Bogota	2.5	4.0	1.0
Guards			
Mamie	2.0	5.0	0.0
Orion	2.0	4.0	0.0
Cortina	2.0	5.0	0.0
Darline	2.0	4.0	1.0
Cavendish	2.0	4.0	3.0
Darlibelle	2.0	5.0	0.0

Key

Vigour	Verticillium
1 = very weak	1 = dead
2 = weak	2 = severely stunted
3 = medium	3 = significant vigour reduction
4 = vigorous	4 = some outer leaves dead
5 = very vigorous	5 = healthy

Mildew on plants

0 = absent
1 = slight (barely visible)
2 = moderate
3 = severe (leaves distorted/necrosis)

Table 21 - 1993 Yields in grammes/plant 50% pick dates

Variety	Large	Medium	Total >25mm	Small	Class II	Umkmt	Total Yield	50% pick date
Elsanta	75	54	129	2	47	32	210	12/6
EM316	151	38	189	0	18	56	263	19/6
EM396	127	112	239	7	92	234	572	29/6
EM341	168	121	289	12	27	72	400	26/6
EM934	89	72	161	0	27	51	239	16/6
EM200	167	83	250	10	20	96	376	21/6
EM284	54	29	83	2	2	27	114	12/6
EM404	129	66	195	3	16	58	272	1/7
EM415	121	43	164	2	21	23	215	12/6
EM216	58	37	95	0	21	23	139	11/6
EM426	16	40	56	5	4	20	85	9/6
EM384	36	16	52	1	2	21	76	9/6
Pegasus	52	16	68	0	11	25	104	13/6
C Favourite	39	51	90	3	7	25	125	13/6
Honeye	56	19	75	2	5	12	94	9/6
Bogota	41	98	139	20	51	65	275	25/6
ES990	67	51	118	0	35	60	213	14/6
Guards								
Mamie	3	79	82	59	0	23	164	13/6
Orion	42	26	68	1	9	14	92	9/6
Cortina	26	18	44	0	1	7	52	4/6
Darline	10	31	41	1	10	7	59	9/6
Cavendish	8	15	23	0	7	9	39	8/6
Darlibelle	5	10	15	1	1	5	22	11/6

100g fruit = 2.6 tonne/hectare (approximately 1 ton fruit/acre)

Table 22 - 1993 Quality Assessments at Picking and Shelf Life Tests

Variety	Appearance	Skin Firmness	Flesh Firmness	Selection Index	Shelf Life
Bogota	6/5	5/5	5/5	5/5	Soft/weak skin
ES990	4/4	6/7	7/7	4/5	Very soft
Guards					
Orion	4	3	4	3	Soft
Darline	5	6	6	5	
Cavendish	4	6	5	5	

Scores are means for each plot 1 = lowest score, 9 = highest score
 Shelf life tests were completed in a shaded room at ambient temperature. The fruit was recorded for a 48 hour period after picking

2.5.4 CONCLUSIONS

Results from this trial do not alter any of the conclusions drawn from trial 42. Selections not contained in trial 42. Selections not contained in trial 42, ES990, Orion, Darline and Cavendish were not of sufficient fruit quality or cropping potential to merit further evaluation.

2.6 STRAWBERRY VARIETY TRIAL 44

2.6.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to complement or replace Elsanta, upon which the UK strawberry industry has become increasingly dependant.

2.6.2 MATERIALS AND METHODS

Plants were raised for this trial from mist propagated tips and planted on 10 August 1993 in methyl bromide fumigated land. Raised beds were created at 1.5m centres, each with a single line of trickle irrigation and black polyethylene mulch. Plants were spaced at 0.5m x 0.3m in double staggered rows. A complete randomised block design was utilised with three replicates each of ten plants. A number of selections (marked *) had been in previous trials and were planted in this trial for further assessment.

Treatments

Standards/Controls	From HRI East Malling	
Elsanta	EM200*	EM208*
Cambridge Favourite	EM235*	EM319*
Honeoye	EM344	EM359
Bogota	EM372	EM383
Pegasus	EM424	EM426*
Rhapsody	EM463	EM470
	EM478	EM514
	EM521	EM555
Guards	ES937	ES1041*
Gardena	Idea	Linda
Sella	Marmolada	Coral
Premial		

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment. Shelf life assessments were made on samples taken from three picks during a selection season and scored after 24, 48 and 72 hours.

2.6.3 RESULTS AND DISCUSSION

In flowering, the quality of anthers was variable in some selections. EM555 was almost male sterile.

Early selections (with 50% pick date before 19 June) compared with Honeoye were ME426, EM514, EM424 and EM478. EM514 has good fruit firmness, better than Elsanta but low yield. EM478 crop was lower than Honeoye with fruit quality scores lower and poorer shelf life. EM424 had exceptionally good shelf life and reasonably good fruit quality scores but was low yielding. The most promising early selection was EM426 with shelf life similar to Honeoye, albeit with darker fruit and very good cropping potential.

Midseason selections (50% harvest, 20-27 June) did not show outstanding performance against Elsanta and Pegasus. EM393 had very good flavour but received poor scores for appearance of fruit. Perhaps EM521 gave best all round performance with good yield, low proportion of unmarketable fruit and reasonably good fruit quality.

Table 24 - Mean number of crowns per plant 22 September 1993

Variety/selection	Mean Crown number/plant
Rhapsody	2.2
EM383	2.0
EM372	1.6
EM344	1.4
EM555	1.4
Idea	1.4
EM424	1.3
EM426	1.3
Bogota	1.3
EM235	1.2
EM463	1.2
EM470	1.2
ES1041	1.2
Honeye	1.2
EM200	1.1
EM208	1.1
EM514	1.1
EM521	1.1
Cambridge Favourite	1.1
Gardena	1.1
Marmolada	1.1
Pegasus	1.1
EM319	1.0
EM359	1.0
EM478	1.0
ES937	1.0
Coral	1.0
Elsanta	1.0
Linda	1.0
Premial	1.0
Sella	1.0

Table 25 - 1994 Mean Yield (g/plant) and Season

VARIETY	CLASS I			TOTAL CLASS I > 22mm	CLASS II	UNMKT	TOTAL YIELD	MEAN 50% PICK DATE
	LARGE	MEDIUM	SMALL					
EM208*	478	169	106	753	15	143	911	30/6
EM344	425	212	110	747	105	146	998	29/6
EM426*	243	190	169	602	66	115	783	17/6
EM200*	289	183	113	585	59	363	1007	3/7
EM521	213	168	173	554	8	65	627	22/6
EM319*	288	188	70	546	65	111	722	25/6
Honeoye	276	166	59	501	34	65	600	17/6
Rhapsody	96	176	218	490	105	169	764	1/7
EM359	319	115	40	474	33	184	691	21/6
EM463	264	135	61	460	51	111	622	24/6
Pegasus	268	125	50	443	25	131	599	24/6
EM383	248	101	57	406	8	151	565	23/6
Elsanta	185	144	66	395	106	80	581	23/6
EM555	132	108	110	350	62	377	789	3/7
Bogota	238	94	43	375	128	193	696	29/6
EM372	233	82	33	348	13	139	500	28/6
EM514	169	100	76	345	27	40	412	15/6
EM235*	180	90	48	318	93	101	512	28/6
EM478	203	111	24	338	13	36	387	17/6
ES1041*	99	129	73	301	27	44	372	22/6
C Favourite	112	126	61	299	14	94	407	23/6
ES937	129	85	67	281	30	135	446	26/6
EM424	207	56	13	276	41	62	379	16/6
EM470	152	84	31	267	9	43	319	23/6

Table 26 - Guards - 1994 Mean Yield (g/plant) and Season

VARIETY	LARGE	CLASS I MEDIUM	SMALL	TOTAL CLASS I > 22mm	CLASS II	UNMKT	TOTAL YIELD	MEAN PICK DATE	50% DATE
MARMOLADA	221	104	49	374	69	99	542	19/6	19/6
GARDENA	233	60	6	299	78	78	455	19/6	19/6
IDEA	204	80	1	285	157	77	519	25/6	25/6
PREMIAL	130	57	30	217	14	71	302	15/6	15/6
SELLA	178	27	9	214	35	102	351	18/6	18/6
LINDA	151	42	12	205	40	56	301	23/6	23/6
CORAL	10	47	71	128	28	56	212	17/6	17/6

Table 27 - Mean Quality Assessments at Harvest - 1994

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX
EM208*	6	4	4	6	5
EM344	5	5	6	4	4
EM426*	5	5	4	6	5
EM200*	5	3	4	5	4
EM521	6	5	5	5	5
EM319*	4	5	6	5	5
Honeoye	6	3	5	6	6
Rhapsody	4	3	5	5	5
EM359	5	3	4	4	4
EM463	5	4	6	4	4
Pegasus	5	4	5	5	5
EM383	4	6	5	7	5
Elsanta	4	6	6	4	5
EM555	5	4	5	4	5
Bogota	5	2	2	2	4
EM372	5	3	5	5	3
EM514	5	7	9	5	5
EM235*	7	7	6	6	4
EM478	5	4	5	6	7
ES1041*	5	5	5	6	5
C Favourite	5	2	3	5	5
ES937	5	4	4	5	4
EM424	6	6	7	6	5
EM470	5	4	5	6	6
GUARDS:					
MARMOLADA	5	7	7	5	5
PREMIAL	5	4	4	6	5
CORAL	4	6	6	7	5

Table 28 - Mean Shelf Life Scores

VARIETY	24 HOURS			48 HOURS			72 HOURS					
	APPEARANCE	COLOUR	SKIN FIRMNESS	FLESH FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS	FLESH FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS	FLESH FIRMNESS
Bogota	3.0	5.0	3.67	2.33	2.33	5.67	3.0	1.67	1.67	6.33	3.0	1.0
C Favourite	5.0	3.0	3.0	3.67	4.33	3.0	3.0	2.33	2.33	3.0	2.33	2.33
Elstaria	5.67	5.67	6.33	6.33	4.33	5.67	6.33	6.33	3.67	5.67	5.0	3.67
Hexeye	6.0	7.0	4.0	4.0	5.0	8.0	4.0	3.0	3.0	8.0	4.0	4.0
Pegasus	5.0	5.67	3.0	3.67	5.0	7.0	3.67	4.33	4.33	7.67	3.0	3.0
Rhapsody	5.0	8.33	3.67	4.33	2.33	8.33	3.67	2.33	2.33	8.33	3.0	3.0
EM200	5.67	7.67	5.0	3.67	4.33	7.67	3.67	3.67	3.67	8.33	3.67	3.0
EM208	5.67	6.33	3.0	3.0	4.33	6.33	3.0	3.00	3.67	6.33	2.33	3.0
EM235	7.0	7.0	5.67	6.33	6.33	7.0	5.67	6.33	4.33	7.0	5.0	5.67
EM319	4.33	4.33	5.0	5.0	4.33	5.67	4.33	5.0	4.33	5.67	4.33	4.33
EM344	5.67	4.33	4.33	3.67	5.0	5.0	4.33	3.67	3.67	5.0	4.33	2.33
EM359	4.33	6.33	5.0	5.0	3.67	8.33	3.67	4.33	2.33	8.33	3.67	3.67
EM372	5.67	7.00	5.0	5.0	5.0	7.0	5.0	5.0	5.0	7.67	5.67	4.33
EM383	4.33	5.0	5.0	3.67	3.67	5.67	4.33	4.33	2.33	5.67	4.33	3.00
EM424	7.0	6.33	7.67	7.67	6.33	7.0	7.67	7.0	5.67	7.0	6.33	5.67
EM426	5.0	8.33	5.0	5.0	4.33	8.33	5.67	5.0	3.0	8.33	3.67	3.67
EM463	7.0	5.67	4.33	5.0	5.0	5.67	5.0	3.0	3.0	6.33	3.67	4.33
EM470	5.67	5.0	3.67	6.33	5.0	6.33	4.33	6.33	3.67	6.33	4.33	5.67
EM478	5.0	3.67	3.67	5.0	5.0	5.0	3.0	4.33	4.33	5.0	3.0	4.33
EM514	6.33	5.67	8.33	8.33	5.0	5.67	8.33	4.33	4.33	6.33	8.33	7.67
EM521	5.67	5.0	5.67	5.67	5.0	5.0	4.33	5.0	3.0	6.33	3.67	4.33
EM555	5.0	3.67	5.0	4.33	4.33	5.0	4.33	4.33	3.0	5.0	4.33	3.0
ES937	3.67	7.0	5.0	3.67	3.0	7.0	3.67	2.33	2.33	7.0	3.67	3.0
ES1041	6.0	5.0	6.0	6.0	5.0	5.0	6.0	4.0	4.0	6.0	5.0	4.0

Table 29 - Flower Characteristics - 1994

Variety	Date of Full Flower	Anther Quality Score
Elsanta	12/5	3
Bogota	17/5	3*
Rhapsody	23/5	3*
Honeoye	9/5	3
Cambridge		
Favourite	9/5	2
Pegasus	14/5	3*
EM200	20/5	3
EM208	16/5	4*
EM235	8/5	3
EM319	13/5	1
EM344	12/5	2
EM359	12/5	4
EM372	24/5	5
EM383	15/5	3
EM424	12/5	4
EM426	6/5	3
EM463	10/5	2
EM470	15/5	3
EM478	16/5	3*
EM514	1/5	4
EM521	10/5	3
EM555	16/5	1
ES937	16/5	2
ES1041	14/5	2

Guards

Gardena	4/5	1
Linda	15/5	2
Idea	11/5	2
Sella	9/5	3
Marmolada	7/5	3
Coral	6/5	1
Premial	2/5	3

Key: Full Flower = 80% of flowers fully open

Anther Quality Score Key:

0 = anther absent
 1 = poor
 5 = very poor * = variable

Table 30 - Plant Habit

Variety	Mean Crown number/ plant	Mean Vigour
Elsanta	1.0	2.0
Bogota	1.3	2.7
Rhapsody	2.2	3.3
Honeoye	1.2	3.0
Cambridge		
Favourite	1.1	2.7
Pegasus	1.1	2.7
EM200	1.1	4.0
EM208	1.1	4.0
EM235	1.2	2.7
EM319	1.0	3.0
EM344	1.4	2.7
EM359	1.0	2.7
EM372	1.6	3.3
EM383	2.0	3.7
EM424	1.3	3.0
EM426	1.3	3.7
EM463	1.2	3.7
EM470	1.2	3.3
EM478	1.0	2.0
EM514	1.1	2.0
EM521	1.1	3.0
EM555	1.4	3.3
ES937	1.0	2.3
ES1041	1.2	4.7
Gardena	1.1	2.5
Linda	1.0	3.0
Idea	1.4	4.0
Sella	1.0	3.0
Marmolada	1.1	2.0
Coral	1.0	2.0
Premial	1.0	2.0

Crown Number = 22 September 1993

Plant Vigour = May 1994

Vigour Assessment Key:

- 1 = very weak
- 2 = weak
- 3 = medium vigour
- 4 = vigorous
- 5 = very vigorous

Late selections (with 50% harvest date after 28 June) did produce some potential varieties with good performance. EM200 and EM555 were the latest selections, 4 days after Bogota. EM555 had poor anther quality and poor fruit flavour with yield and fruit size comparable to Bogota. EM200 had a much higher yield but with a high level of unmarketable fruit and fruit quality scores, only slightly better than Bogota. EM235 produced fruit firmer than Elsanta with good appearance but slightly lower yield. EM208 and EM344 performed well with both having a better shelf life than Bogota.

2.6.4 CONCLUSIONS

EM426 should be considered for use as an early variety and compared with Honeoye and Elsanta under protected growing systems. Both EM208 and EM344 should be considered for further evaluation and incorporation in grower trials.

Table 31 - Mean Yield (g/plant) and Harvest Date - 1992

Variety	Large >35mm	Medium 25-35mm	Total	Small 18-25mm	Unmktble	Total	50% Pick Date
SBJ 7	180	325	505	124	330	959	1/8
SBJ 1 (Tango)	238	244	482	64	403	949	22/7
SBJ 2 (Calypso)	111	291	402	144	223	769	7/8
EMR 62	84	210	294	91	324	709	5/8
RAPELLA	67	169	236	83	593	912	4/8
†SBJ 1	207	311	518	67	325	910	22/7
†SBJ 2	181	317	498	121	310	929	7/8
†SBJ 7	134	340	474	75	479	1028	26/7
†RAPELLA	71	198	269	85	544	898	27/7

Plants propagated at HRI Efford.

Midseason selections (50% harvest, 20-27 June) did not show outstanding performance against Elsanta and Pegasus. EM393 had very good flavour but received poor scores for appearance of fruit. Perhaps EM521 gave best all round performance with good yield, low proportion of unmarketable fruit and reasonably good fruit quality.

2.7 STRAWBERRY EVERBEARER VARIETY TRIAL 10

2.7.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to replace Rapella and to a lesser extent Ostara, upon which the UK strawberry industry is currently dependant for late season fruit from everbearing, day neutral or remontant varieties.

2.7.2 MATERIALS AND METHODS

The trial plants were raised from runner tips in 1991 and potted on for planting the following spring. Raised beds were created at 1.5m centres and covered with black polyethylene mulch with a trickle irrigation line down the centre of each bed. Plants were spaced at 0.5m x 0.3m in double staggered rows. A randomised block experimental design was used with three replicates each of fifteen plants. Two replicates were planted on 15 April 1992 from plants raised at Brogdale, the third was planted on 27 April 1992 using plants raised at HRI Efford.

Treatments

Varieties

Control	From HRI East Malling
Rapella	SBJ7
	SBJ1 (Tango)
	SBJ2 (Calypso)
	EMR62

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment.

2.7.3 RESULTS AND DISCUSSION

The 1992 season was very early with the first pick on 30 June. Cropping also stopped early in the season on 14 September. This is most likely to have occurred as high temperatures which occurred in June triggered thermal dormancy particularly as plants started flowering again in late August.

The trial was planted in to non fumigate land and by mid July plants were showing signs of stress due to verticillium wilt infection.

The generally large amount of unmarketable fruit was partly due to seed beetle damage in the early part of the season. Mildew particularly affected Rapella. EMR62 (LA988 X Selva) comparable to Rapella in fruit size and yield but firmer skin and flesh, the selection had a brownish-red appearance when fully ripe. It is susceptible to mildew on the leaf. SBJ7 had a high yield and 50% pick date was 3 days ahead of Rapella. Produced a bright, glossy orange, red fruit with good shape and overall fruit quality better than Rapella. Tango (SBJ1 Rapella x Selva) had a high yield and early season, 50% harvest, 13 days before Rapella. Fruit shape was generally good with overall fruit quality assessment scores better than Rapella and colour bright and glossy. Calypso (SBJ2 Rapella x Selva) had a slightly lower yield than Tango with a lower proportion of large fruit. Its season was a little later than Rapella but fruit quality better. SBJ7 produced fruit with good quality scores but perhaps the weakest flavour of selection in this trial. Its 50% pick date was just before Rapella with both yield and fruit size good.

Table 32 - Fruit Quality Assessment - 1992

Selection	Appearance	Skin Firmness	Flesh Firmness	Flavour	Selection Index
SBJ 7	6	6	6	5	6/7
SBJ 1	6/5	6	6	5	6/5
SBJ 2	5/6	6	6	6	6/5
EMR 62	5	7	7	5	6
RAPELLA	5	4	6	6	5/4

2.7.4 CONCLUSIONS

Both SBJ1 (Tango) and SBJ2 (Calypso) were recommended for wider evaluation, Tango as a high yielding, early variety and Calypso to replace Rapella with better crop and fruit quality.

2.8 STRAWBERRY EVERBEARER VARIETY TRIAL 11

2.8.1 INTRODUCTION

The introduction and successful exploitation of new varieties offers the opportunity for improving yield and quality whilst reducing unit costs of production as well as meeting any changing market requirements. Breeding and evaluation of new varietal selections is aimed at introducing new varieties with good fruit quality attributes and, if possible, resistance to pests and diseases. Of particular interest is the identification of a new variety to replace Rapella and to a lesser extent Ostara, upon which the UK strawberry industry is currently dependant for late season fruit from everbearing, day neutral or remontant varieties. In this trial named varieties from European breeding programmes are compared with a New Zealand variety and Rapella as control.

2.8.2 MATERIALS AND METHODS

Plants were raised from mist propagated tips in 1992 and overwintered prior to planting on 23 March 1993 in methyl bromide fumigated land. Raised beds at 1.5m centres with a single line of trickle irrigation and black polyethylene mulch were used as the growing system plants being spaced at 0.5m x 0.3m in double staggered rows. A complete randomised block experimental design was used with three replicates each of fifteen plants.

Treatments

Varieties

Control	From HRI East Malling:
Rapella	Calypso
	Tango
From E Vinson Ltd UK:	
Evita	From Darbonne, France:
	Darestival
From Marionnet, France:	Darflash
Mara de Bois	
	From New Zealand:
	Donna

Fruit quality assessments were made on a 1 to 9 scale with the higher score, the better the assessment. A score of 5 was regarded as acceptable. Assessments were made at each pick and the final score was the mean of all picks. The technique is similar to that developed by plant breeders at HRI East Malling for strawberry fruit assessment. Shelf life tests were carried out by placing sample punnets in a shaded room at ambient temperature (c18°C) and fruit assessed after 24, 48 and 72 hours.

2.8.3 RESULTS AND DISCUSSION

The 1993 season was particularly bad for mildew infection on everbearer varieties (table 33), with control difficult to achieve despite the application of twelve sprays, commencing on 11 May 1993, using Rubigon, Nimrod, Bavistin and latterly sulphur. Mildew rapidly established on Rapella. Infection was heaviest on plants of Rapella and Calypso and less so on Tango which had more fruit infection. Darestival and Donna had good field resistance to mildew with Evita and Darflash having very low levels. Tango, Darflash and Rapella were the strongest growing plants, whilst those of Donna were relatively weak.

The control variety, Rapella, is out classed by new varieties in this trial in fruit quality. The high level of unmarketable Rapella was due to mildew infection on fruit. Evita and Tango produced the heaviest crops of marketable fruit with Tango having the higher yield potential. High levels of unmarketable fruit for Tango were largely caused by mildew infection on the fruits. Tango also produced a high proportion of large fruit and was the earliest ripening.

Table 33 - Plant Vigour and Powdery Mildew assessments

Variety	Vigour		Mildew - 1993	
	Autumn 1993	23 June	6 July	27 July
Evita	3.3	0	0.3	0.7
Tango	4.0	0.3	1.3	1.7
Mara des Bois	3.0	1.0	1.0	1.7
Darestival	3.0	0	0	0
Darflash	4.3	0	0	0.7
Donna	2.7	0	0	0
Calypso	3.0	1.7	2.7	3.0
Rapella	4.3	2.3	2.0	2.3
Vigour		Mildew on plants		
1=very weak		0=absent		
2=weak		1=slight (barely visible)		
3=medium vigour		2=moderate		
4=vigorous		3=severe (distorted leaves/necrosis)		
5=very vigorous				

Table 34 - Yields in (g/plant) and Harvest Date - 1993

Variety	Class I		Medium	Total	Small	Class Unmktble		Total	50% Pick Date
	Large	Small				II			
Evita	164		301	465	32	186	205	888	7/8
Tango	223		218	441	25	221	871	1558	30/7
Mara des Bois	78		200	278	26	88	174	566	12/8
Darestival	124		152	276	14	125	216	631	12/8
Darflash	99		142	241	18	113	136	508	20/8
Donna	69		129	198	18	100	183	499	9/8
Calypto	40		87	127	13	100	327	567	11/8
Rapella*	19		40	59	11	68	672	810	11/8

*calculated yields from a smaller number of plants, as mixtures of other varieties present

100g fruit = 2.6 tonne/hectare (approximately 1 ton fruit/acre)

Table 35 - 1993 Quality Assessment Scores at Harvest 1993

Variety	Appearance	Skin Firmness	Flesh Firmness	Flavour	Selection Index	Other
Tango	6/6/5	6/5/5	5/4/4	5/5/4	5/5/4	Irregular Shape/Mildew
Evita	6/6/7	6/6/5	6/7/6	6/5/5	5/6/6 *	
Mara des Bois	6/6/5	6/5/5	5/6/5	6/6/7	6/5/5 *	
Darestival	6/6/6	6/6/4	4/5/4	5/5/5	4/4/4	Pale flesh
Darflash	5/5/6	7/7/7	7/6/7	5/5/6	5/5/6	White shoulder
Donna	5/4/5	6/7/7	7/7/7	5/4/5	5/5/5	Half moon shape
Calypso	4/4/4	7/7/7	5/6/5	4/5/4	4/4/3	Mildew/malformed
Rapella	3/3/3	2/3/4	3/3/2	3/5/5	2/3/2	Mildew/malformed

Scores are means for each plot

1= lowest score, 9 = highest score

*good shelf life

Table 36 - Mean Shelf Life Scores - 1993

VARIETY	24 HOURS			48 HOURS			72 HOURS		
	APPEARANCE	COLOUR	SKIN FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS
Tango	5.7	4.3	7.0	3.7	5.3	5.7	3.0	6.5	4.0
Evila	7.0	5.5	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Dorcas	4.0	7.0	8.0	4.0	4.0	7.0	8.0	9.0	7.0
Dorcas	5.0	5.0	6.0	3.0	5.0	6.0	5.0	6.0	3.0
Mara des Bois	6.0	5.5	7.0	5.0	6.0	7.0	6.0	7.0	7.0
Raspaja	5.0	5.0	7.0	3.0	6.0	7.0	3.0	6.0	5.0
Calypto	3.0	7.0	7.0	3.0	7.0	7.0	5.0	7.0	7.0
Darflash	5.0	4.5	7.0	5.0	5.0	7.0	6.0	6.0	7.0

VARIETY	24 HOURS			48 HOURS			72 HOURS		
	APPEARANCE	COLOUR	SKIN FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS	APPEARANCE	COLOUR	SKIN FIRMNESS
Tango	5.7	4.3	7.0	3.7	5.3	5.7	3.0	6.5	4.0
Evila	7.0	5.5	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Dorcas	4.0	7.0	8.0	4.0	4.0	7.0	8.0	9.0	7.0
Dorcas	5.0	5.0	6.0	3.0	5.0	6.0	5.0	6.0	3.0
Mara des Bois	6.0	5.5	7.0	5.0	6.0	7.0	6.0	7.0	7.0
Raspaja	5.0	5.0	7.0	3.0	6.0	7.0	3.0	6.0	5.0
Calypto	3.0	7.0	7.0	3.0	7.0	7.0	5.0	7.0	7.0
Darflash	5.0	4.5	7.0	5.0	5.0	7.0	6.0	6.0	7.0

DESCRIPTIONS OF FRUIT FROM SHELF LIFE TESTING

Fruit was placed in a shaded position in a room at ambient temperature then held and recorded over a 48 hour period.

Evita - two tests, started on 3 and 26 August. Soft patches developed on the skin of the fruit in the first test

Tango - three tested started on 6 July, 8 and 26 August. The fruit was soft, developing soft patches on the skin in the first test. Quality was reduced by mildew infection in the second test.

Mara des Bois - two tests started on 3 and 26 August. Quality was generally good.

Darestival - two tests started on 3 and 26 August. Softe patches developed on the fruit skin reducing quality

Darflash - two tests starting on 3 and 26 August. Dry and soft patches developed on the fruit skin

Donna - two tests started on 3 and 26 August. Fruit colour became very dark

Calypso - one test started on 3 August. Mildew ruined the fruit

Rapella - one test started on 3 August. Mildew on the fruit was a major problem.

Darflash was the latest fruiting variety in trial. Evita and Mara des Bois produced the best quality fruit. Evita also had good shelf life. Tango fruit was generally soft and mildew ruined the quality of this variety and that of Calypso and Rapella in shelf life tests. Fruit of Donna darkened considerable in shelf life tests.

2.8.4 CONCLUSIONS

With the exception of Donna, all the varieties in this trial are worth further evaluation and offer the opportunity to spread the season for this type of strawberry. The two outstanding varieties were Tango, for its high yield potential and early season, and Evita, for its fruit quality, shelf life and mildew tolerance together with good yield.

2.9 GROWER TRIALS - STRAWBERRY

Calypso - 1992

Of the 8 sites which participated in the trial in 1991. 4 retained their Calypso plants to assess its performance in the second year. None of the sites completed yield records but their comments are noted below.

1. Faversham, Kent - P Vinson

There was no direct comparison but it was felt that Calypso did not crop as heavily as 2 year old Rapella.

Calypso started cropping rather late then cropped heavily for a short period and produced very little after that.

Calypso produced a lot of crowns and it was felt that de-crowning after the first crop was essential if it was to be kept for a second year.

It was difficult to get a supermarket pick and overall, Rapella was preferred.

2. Canterbury, Kent - P Vinson

Again there was no direct comparison with Rapella.

Generally, Calypso impressed with yield and quality. It easily out yielded 1 year old Calypso and it was felt that taking into account previous experience of 2 year old Rapella. Calypso was better.

There was no problem with fruit shape or size.

It was definitely worth growing for 2 years if it fitted in with the growing programme.

3. Ledbury, West Midlands - A Davison

Calypso only yielded 50% of Rapella.

Quality was good i.e. most of it was suitable for supermarket

Calypso was definitely worth growing for 2 years but Rapella would be preferred because of its heavier yield over the 2 seasons.

4. Wisbech, East Anglia - H Duncalfe

Calypso only yielded 75% of Rapella but fruit quality and size was better.

Calypso was worth growing for 2 years but again Rapella was preferred because of its better cropping over both seasons.

Conclusion

Although Rapella has poorer fruit quality than Calypso this can be minimised by good husbandry and good control during picking. The most important factor to the grower is still the yield of marketable fruit and in most cases Rapella outyields Calypso.

EM224 and EM227 - 1992

Objective

To evaluate both selections as potential second-early varieties: they are seen as competitors for the Hapil and Gorella season rather than Elsanta and for PYO and the wholesale markets rather than the supermarket trade.

Sites

Four sites were chosen in the main growing areas of England, one in Scotland and one in Northumberland. The two northern sites were chosen to see whether the selections' performance imitated that of other early varieties which often perform better than in the south, particularly Honeoye which is a parent of both selections.

Site	Location	Grower
1	Kent	D Pascoe
2	East Anglia	H Duncalfe
3	Somerset	P Parris
4	West Midlands	S Smith
5	Northumberland	W Dickinson
6	Scotland	P Thomson

Establishment and Plant Characteristics

	PLANT ORIGIN		NO PLANTS		PLANTING	CROPPING	
	EM224	EM227	EM224	EM227	Date	EM224	EM227
1	CS	CS	1700	1700	29/5	Yes	Yes
2	CS	CS	1700	1700	1/7	No	No
3	CS	FD	1700	1700	6/5	No	No
4	CS	CS	1600	2100	14/5	Yes	Yes
5	CS	CS	1700	1700	5/3	Yes	Yes
6	CS	FD	1700	1700	4/5	Yes	No

CS = cold store runners

FD = fresh dug runners

Plants on all sites established well. EM224 was more vigorous than EM227; up to 50% greater when cropping started. Cropping was light and no detailed records were kept but on site 5 it was estimated that EM224 had a heavier yield than EM227 and on site 4, EM224 had nearly twice the yield of EM227.

Fruit Quality

EM224 had good fruit size and a regular shape. On site 6 there were fewer misshapes than Elsanta

It had a glossy medium red skin. Flesh and skin firmness was not quite as firm as Elsanta but considered good

Flavour was pleasant

EM227 had a similar fruit size and shape to EM224 but was a more pointed conic. It was also seedier.

On site 5 many of the early primaries were double fruit with hollow centres

Skin and flesh were softer than EM224 and it felt a little spongy

Flavour was weaker and generally thought to be bland.

Detailed records of yield and fruit quality will be taken in 1993 and 1994.

2.10 EUROPEAN STRAWBERRY NETWORK - VARIETY TRIAL 1

2.10.1 INTRODUCTION

The European strawberry industry is large, covering a range of climatic types, production systems and markets. To service this diversity a wide range of varieties are utilised and new varieties are drawn from breeding programmes in different areas.

This first internationally co-ordinated trial seeks to evaluate advanced selections and varieties at the point of release to commercial production. Trials are established in EEC countries using a common list of varieties and methodology. Material and results are interchanged between participating member countries. Funding from the EEC at present covers attendance at group meetings. Although in its early stages, this arrangement provides a useful forum for exchange of information and a mechanism for bidding for EEC research grants.

Although not funded by HDC, the results of this work to date are outlined and included for completeness and to make the results available to British growers.

2.10.2 MATERIALS AND METHODS

The first trial was established in 1993. Each country establishes a nursery to propagate material received from the breeders.

Material for the trial started to arrive in April 1993. Tip raised plants were propagated under mist and sufficient material was available for planting on 26 August 1993. Planting took place in methyl bromide sterilised land in raised beds, each with single trickle irrigation line, covered with black polyethylene mulch. Spacing in the bed was 0.3m x 0.3m staggered double rows with 1.5m bed centres. Single 28 plant plots of each variety were planted.

Participating EEC countries

Belgium	Italy	Denmark
Netherlands	Eire	Spain
France	UK	Greece

Varieties

Source	Variety
Darbonne, France	Darsidor
	DA1
	DA9
ERSO, Italy	Idea
	Linda
CIV, Italy	Cortina
	Gardena
	Sella
CPRO DLO, Netherlands	Lambada
	Elsanta (North Europe Control)
Planasa, Spain	Tudla
Spain	Chandler (South Europe Control)

In addition, it was proposed the Durval and Villanova - IVIA, Spain and Symphony, SCRI, should be planted. These were not sent

A record methodology is being developed by the participants in this series of studies in order to generate data in a common form.

2.10.3 RESULTS AND CONCLUSIONS

Cortina, Gardena, Lambada and DA1 were comparable in season to Elsanta but other selections were somewhat later. Darsidor and Idea were the latest, 10 days after Elsanta. Chandler and Tudla were very low yielding in this trial and both had soft fruit. Sella cropped well with a large proportion of Class I large fruit. Lambada had a very high flavour score with good yield but its firmness, particularly skin, was poor.

TABLE 37 MEAN YIELD (G/PLANT) AND SEASON - 1994

VARIETY	CLASS I			TOTAL CLASS		CLASS II	UNMKT	TOTAL YIELD	MEAN 50% PICK DATE
	LARGE	MEDIUM	SMALL	I > 22mm	II				
SELLA	396	76	35	507	44	145	696	21/6	
DARSIDOR	227	103	87	417	18	61	496	29/6	
IDEA	230	105	25	360	88	37	485	29/6	
LAMBADA	140	121	40	301	4	72	377	19/6	
DA9	198	79	19	296	27	92	415	23/6	
CORTINA	121	131	32	284	50	73	407	18/6	
GARDENA	161	99	13	273	93	92	458	18/6	
LINDA	181	48	23	252	56	26	334	22/6	
ELSANTA	145	74	28	247	83	33	363	19/6	
DA1	142	66	28	236	23	85	344	18/6	
CHANDLER	29	48	44	121	84	44	249	22/6	
TUDLA	38	24	12	74	64	41	179	25/6	

TABLE 38 STRAWBERRY EUROPEAN NETWORK VARIETY TRIAL 1 - 1994

Mean Quality Assessments at Harvest

VARIETY	APPEARANCE	SKIN FIRMNESS	FLESH FIRMNESS	FLAVOUR	SELECTION INDEX
SELLA	5	4	5	5	5
DARSIDOR	5	4	5	7	6
IDEA	4	5	6	6	4
LAMBADA	5	3	5	8	5
DA9	5	5	5	3	3
CORTINA	5	4	5	6	5
GARDENA	5	4	5	6	5
LINDA	7	7	7	4	4
ELSANTA	6	6	7	6	6
DA1	7	3	3	5	5
CHANDLER	4	4	4	6	5
TUDLA	3	3	3	5	3

2.10.4 CONCLUSION

The varieties Tudla, Chandler, DA1 and DA9 are eliminated as being unsuitable for UK conditions. Further appraisal of the other varieties is desirable although none were outstanding in this initial trial. Lambada is of interest particularly for its flavour but is let down by lack of skin firmness.

3.

NEW VARIETY SUMMARY NOTES

Towards the end of the valuation trials procedure, the available information is drawn together in order to provide a summary and digest of a variety's performance and outline its strengths and weaknesses. Information presented in this form is intended to assist growers and others in the industry in their decision making.

NEW VARIETY NOTE - 67

STRAWBERRY: RHAPSODY

ORIGIN Cambridge Favourite x 61G51. Raised at the Scottish Crop Research Institute in 1969 and tested as 69EW30. Plant Variety Rights are held by Plant Breeding International, Cambridge, Limited

AVAILABILITY Planting stock is available

TRIALS Initially planted in Strawberry Variety Trial 20 at the National Fruit Trials (NFT) and subsequently in Multi Centre Strawberry Variety Trials 6 and 7 at a number of experimental sites.

CROPPING Flowering - a week later than Cambridge Favourite

Fruit - large to medium, long conical glossy red with moderately firm orange/red flesh. Flavour is moderately strong, acid/sweet. Calyx removal moderately difficult.

SEASON Summer fruiting, late, similar to that of Bogota

YIELD 1979-80 Accumulated yield, tonne/ha, 1980, 50% harvest date

Variety	Accumulated Yield - 1979/80 g/plant			Total	Class III	Unmarketable	50% harvest date
	Large	Medium	Small				
Rhapsody	364	789	238	1391	229	260	17/7
Cambridge Favourite	210	669	262	1141	402	347	8/7

Source of data: NFT Strawberry Variety Trial 20

1994 Yield, Quality and 50% Harvest Date

Variety	Yield g/plant			Total	Class III	Unmarketable	50% harvest date
	Large	Medium	Small > 22mm				
Rhapsody	96	176	218	490	105	169	1/7
Cambridge Favourite	112	126	61	299	14	94	23/6
Elsanta	185	144	66	395	106	80	23/6

(Source of data: Brogdale Strawberry Variety Trial 44: funded by HDC)

Rhapsody fruit was larger than that of Cambridge Favourite in Variety Trial 20. Cambridge Favourite yielded more Class III and unmarketable fruit

PLANTS Growth is erect and the vigour medium to strong. Resistant to Red Core and moderately resistant to Verticillium Wilt. Runner production moderate

MARKETING Large to medium sized dessert quality fruit providing continuity after mid season summer fruiting varieties. Rhapsody has performed well in all parts of the UK and although a little earlier than Bogota generally appears a better late variety than Bogota

STRENGTHS Heavy yield of large to medium size fruit
 Moderate to good dessert quality fruit, similar to Bogota in season
 Performs well in all parts of the UK
 Plants resistant to Red Core and moderately resistant to Verticillium Wilt
 Will pollinate Pandora

NEW VARIETY NOTE - 68

STRAWBERRY : SYMPHONY

ORIGIN	Rhapsody x Holiday. Raised at the Scottish Crop Research Institute (SCRI) and tested as 79RB28. Plant Breeders Rights are held by Commercial Fruit Plants
AVAILABILITY	Planting stock available
TRIALS	Planted in Strawberry Variety Trial 33 at the National Fruit Trials (NFT). Also in trial at SCRI.
CROPPING	Flowering - full flower date was four days later than that of Cambridge Favourite in Variety Trial 33 Fruit - large to medium, conical to long conical, red to crimson in colour, sometimes with a white tip. Achenes are raised and the fruit is firm with a tough skin and moderate flavour. Calyx removal is difficult.
SEASON	Later than Cambridge Favourite, three days in 1986 and ten days in 1987.
YIELD	1986-87 accumulated yield, tonne/ha, 50% harvest date Accumulated Yield - mm [Class I] Variety 35+ 25-35 18-25 Total Class Unmarketable 50% harvest date Symphony 4.6 12.8 2.1 19.5 3.5 4.1 9/7 Cambridge Favourite 3.1 13.7 3.6 20.4 2.4 7.5 2/7 (Source of data: NFT Strawberry Variety Trial 33; funded by MAFF) Symphony produced more large Class I fruit than Cambridge Favourite in Variety Trial 33. Yield and fruit quality good in Scotland.
PLANTS	Vigorous, upright/spreading. Some plants were affected by Verticillium Wilt in Variety Trial 33 but symptoms were not severe. Some Red Core resistance. Runner production moderate.
MARKETING	Dessert variety, later than Cambridge Favourite.
STRENGTHS	Large, firm, dessert quality fruit Resistant to Red Core Good variety for the northern part of the UK
WEAKNESSES	Smaller fruit looks 'seedy'.

NEW VARIETY NOTES - 69

STRAWBERRY : MELODY

ORIGIN 66MI x Senga Sengana. Raised by the Scottish Crop Research Institute (SCRI) in 1971 and tested as 71WC64. Plant Variety Rights were granted in 1989. These are held jointly by SCRI and the Scottish Office.

AVAILABILITY Planting stock is available. Number of plants produced is likely to increase

TRIALS Planted in Strawberry Variety Trials 25 and 26 at the National Fruit Trials (NFT).

CROPPING Flowering - Mostly hidden beneath the leaf canopy

Fruit - Medium to small conical red fruit. Internal colour is red, the flesh is firm and the calyx is easily removed.

SEASON Mid season, similar to Cambridge Favourite

YIELD 1982 yield, tonne/ha, 50% harvest date

Variety	Yield - mm			Total	Class III	Class	Unmarketable	50% harvest date
	Class I							
	Large	Medium	Small					
Melody	0.9	6.2	1.5	8.6	1.6	3.2		22/6
Cambridge Favourite	3.6	4.7	0.3	8.6	4.1	4.0		20/6

(Source of data: NFT Strawberry Variety Trial 25; funded by MAFF)

Melody produced less large but more medium and small sized fruit in Variety Trial 25

PLANTS Vigorous and upright. Highly resistant to Red Core and moderately resistant to Verticillium Wilt. Runners freely.

MARKETING For the processing market particularly where a whole fruit product is required, as the fruit is firm textured. Cans well without artificial colour

STRENGTHS Medium to small size fruit, ideal for processing
Easy removal of the calyx and firm fruit products without artificial colour can be produced
Resistant to Red Core and Verticillium Wilt

WEAKNESSES Moderate yields

NEW VARIETY NOTE - 72

STRAWBERRY : RAPELLA

ORIGIN Tioga x Rabunda. Raised in 1972 by IVT, Wageningen, Netherlands and tested as IVT73119. Plant Variety Rights were granted in 1984 and are held by IVT.

AVAILABILITY Planting stock is widely available.

TRIALS In remnant Strawberry Variety Trials 5 and 7 at the National Fruit Trials (NFT).

CROPPING Flowering - Medium size flowers, each with a small calyx. They are below or level with the canopy.

Fruit - Primary fruits are large and often malformed. The most usual shape is long conical and the colour is orange red externally and pale orange internally. Calyx removal is difficult. Flavour is described as medium acid/sweet and the fruit is moderately firm.

SEASON About a week later than Ostara in the autumn fruiting period.

YIELD 1985 yield, tonne/ha, 50% harvest date

Variety	Yield - mm			Total	Class II	Unmarketable	50% harvest date
	Class I						
	35+	25-35	18-25				
Rapella	6.4	8.7	3.0	18.1	9.0	11.0	9/9
Ostara	4.3	10.0	3.8	18.1	3.4	9.5	30/8

(Source of data: NFT Everbearer Strawberry Variety Trial 5; funded by MAFF)

Fruit of Rapella was larger and 50% harvest date nine days later than Ostara in Variety Trial 5.

PLANTS These are very vigorous. They are susceptible to Powdery Mildew and produce few runners from conventional summer production.

MARKETING Dessert use for late summer/autumn fruiting. Can be too late to follow on from the conventional summer fruiting crop.

STRENGTHS Larger, firmer fruit than Ostara

WEAKNESSES Later than Ostara; cropping may not follow on from the conventional summer crop
Fruit shape sometimes poor
Susceptible to Powdery Mildew

NEW VARIETY NOTE - 73

STRAWBERRY : PROVIDENCE

ORIGIN Gorella x S318 (Cambridge Favourite x NY844). Raised at Long Ashton Research Station in 1972 but developed by Horticultural Research International, East Malling and tested at Brogdale as ES404. Plant Variety Rights do not apply.

AVAILABILITY Limited planting stock is available.

TRIALS Planted in Strawberry Variety Trial 24 at the National Fruit Trials (NFT) and subsequently in Strawberry Multi Centre Trial 6 at a number of Experimental Horticulture Stations.

CROPPING Flowering - Full flower date similar to that of Cambridge Favourite in Variety Trial 24. Flowers level with the leaf canopy

Fruit - Smaller than that of Cambridge Favourite, particularly after maiden year. Conical, orange/red, with moderately firm orange flesh. Flavour moderate. Product life good. Calyx removal easy

SEASON Up to five days earlier than Cambridge Favourite

YIELD 1981-82 accumulated yield, tonne/ha, 50% harvest date

Variety	Accumulated Yield - mm			Total	Class II	Unmarketable	50% harvest date
	Class I						
	35+	25-35	18-25				
Providence	5.5	20.4	5.5	31.4	5.1	6.5	29/6
Cambridge Favourite	10.7	20.1	1.7	32.5	7.8	10.9	4/7

(Source of data: NFT Strawberry Variety Trial 24; funded by MAFF)

Total yield of Providence was similar to that of Cambridge Favourite in Variety Trial 24, however fruit size was smaller. Providence was earlier maturing than Cambridge Favourite

PLANTS Vigour is moderate and growth upright. Runner production moderate

MARKETING For the dessert punnet trade with a good product life. Inferior to Elsanta for this market

STRENGTHS Similar yield to Cambridge Favourite but with better fruit colour and product life

WEAKNESSES Smaller fruit size than Cambridge Favourite, particular after the maiden year
Inferior to Elsanta for dessert fruit in this season

NEW VARIETY NOTE - 79

STRAWBERRY : SELVA

ORIGIN 70.3-117 x 71.98-605. Raised at University of California, USA. Plant Variety Rights do not apply

AVAILABILITY Planting stock is available.

TRIALS Planted in remnant Strawberry Variety Trials 7 and 8 at the National Fruit Trials (NFT).

CROPPING Flowering - Relatively few flowers in flushes. Day neutral type.

Fruit - Berries are conical to long conical orange/red with a tough skin. They are very firm with a good product life. Eating quality if poor.

SEASON For the late summer and autumn fruiting period but produces flushes of flowers over a long period.

YIELD 1987 yield, tonne/ha, 50% harvest date

Variety	Yield - mm				Total II	Class	Unmarketable	50% harvest date
	{	Class I	}					
	35+	25-35	18-25					
Selva	2.3	1.9	0.2	4.4	3.1	2.4	16/8	
Rapella	3.6	5.8	1.7	11.1	8.5	6.9	5/9	

(Source of data: NFT Everbearer Strawberry Variety Trial 7; funded by MAFF)

Yield of Selva was much lower than that of Rapella. 50% harvest date was almost three weeks before that of Rapella

PLANTS Vigorous, upright/spreading in habit

MARKETING Provides continuity from summer fruiting strawberries. For the dessert market but poor eating quality limits potential

STRENGTHS Very firm attractive fruit
Provides continuity from summer fruiting strawberries

WEAKNESSES Poor eating quality
Low yields

FOOTNOTE Three other day neutral strawberries, Fern, Tribute and Tristar, have also been tested. These produce firm fruit with a tough skin. Yields of Fern have been low. Tribute and Tristar although producing similar yields in a similar season to Rapella have fruit with poor eating quality

STRAWBERRY : CALYPSO

ORIGIN	Rapella x Seiva. Raised at Horticultural Research International, East Malling in 1985 and tested as EMR 28. Plant Variety Rights granted in 1991 and held by Horticultural Research International
AVAILABILITY	Planting stock is available.
TRIALS	Planted in perpetual fruiting Strawberry Variety Trials 9 and 10 at Brogdale and also at Horticultural Research International Efford and in trials on growers holdings.
CROPPING	Flowering - Extended season. Flowers are medium sized beneath the foliage Fruit - medium to large, conical, red with internal colour orange/red. Skin and flesh firm. Flavour is medium sweet/acid. Fruit trusses are semi erect
SEASON	Remontant type with a similar 50% harvest date to Rapella
YIELD	1992 yield, g/plant, 50% harvest date

Variety	Yield - mm			Total	Unmarketable	50% harvest date
	[Class I]					
	35+	25-35	18-25			
Calypso	111	291	144	546	223	7/8
Rapella	67	169	83	319	593	4/8

(Source of data: BHT Strawberry Everbearer Variety Trial 10; funded by HDC)

Calypso yielded more large and medium size Class I fruit than Rapella in Trial 10, although fruit was rather seedy and darkened quickly in hot weather. Rapella yielded much more unmarketable fruit than Calypso. This was partly due to Rapella fruit being affected by Powdery Mildew. Trials on growers holdings indicate marketable yields of Calypso similar to those of Rapella.

PLANTS	These are of medium vigour, they runner freely
MARKETING	Alternative to Rapella in the same season. Trial results indicate that fruit quality will be better than that of Rapella
STRENGTHS	Fruit quality better than that of Rapella Runners freely
WEAKNESSES	In commercial practice, yield of marketable fruit no heavier than that of Rapella in same marketing season 'Seedy' fruit, may be associated with Powdery Mildew

STRAWBERRY : TANGO

ORIGIN	Rapella x Selva. Raised at Horticultural Research International, East Malling in 1985 and tested as EMR 25. Plant Variety Rights granted in 1992 and held by Horticultural Research International
AVAILABILITY	Planting stock is likely to be available in 1994
TRIALS	Planted in perpetual fruiting Strawberry Variety Trials 9 and 10 at Brogdale and also at Horticultural Research International Efford
CROPPING	Flowering - Extended season. Flowers are small, level with or above foliage Fruit - large to medium, conical, red with orange/red flesh. Skin and flesh firm. Flavour is acid. Fruit trusses are semi erect to prostrate
SEASON	Remontant type reaching 50% harvest date up to two weeks before Rapella
YIELD	1992 yield, g/plant, 50% harvest date

Variety	Yield - mm				Unmarketable date	50% harvest date
	Class 1			Total		
	35+	25-35	18-25			
Tango	238	244	64	546	403	22/7
Rapella	67	169	83	319	593	4/8

(Source of data: BHT Strawberry Everbearer Variety Trial 10: funded by HDC)

Tango yielded much more large and medium size marketable fruit than Rapella in Trial 10. Both varieties yielded much unmarketable fruit, partly due to Seed Beetle damage and 'seedy' fruit caused by Powdery Mildew and Verticillium Wilt stress

PLANTS	These are of medium vigour, they produce few runners
MARKETING	Tango fruit is marketed during the late summer/autumn period but is earlier than Rapella. This gives continuity of production following the late season summer fruiting varieties
STRENGTHS	Heavy yield of large and medium Class 1 fruit Earlier harvesting than Rapella, gives continuity from summer fruiting strawberries
WEAKNESSES	Eating quality is variable Plants produce few runners

STRAWBERRY : PEGASUS

ORIGIN	Redgauntlet x Gorella. Raised at Long Ashton Research Station in 1977 but developed at Horticulture Research International, East Malling and tested as ES608 at Brogdale. Plant Variety Rights granted in 1989 and held by Horticultural Research International
AVAILABILITY	Planting stock is available
TRIALS	First planted in Strawberry Variety Trial 29 at the National Fruit Trials (NFT) and subsequently in Strawberry Multi Centre Variety Trial 8 and in trials on growers holdings
CROPPING	Flowering - profuse and the flowers are held level with the foliage canopy. Full flower was reached a week after Cambridge Favourite in Variety Trial 29 at the NFT Fruit - large to medium, round/conical and glossy orange/red with a tough skin. Flesh which is orange/red is less firm than that of Elsanta.
SEASON	Similar to Cambridge Favourite, sometimes a day or two after this variety and later than Elsanta
YIELD	Multi Centre Trial 8 - accumulated yield, tonne/ha, 1988 and 1989, 50% harvest date

Site/Variety	Accumulated Yield - mm			Total	50% harvest date	
	35+	25-35	18-25		1988	1989
NFT						
Cambridge						
Favourite	3.8	13.5	2.5	19.8	3/7	28/6
Pegasus	8.9	15.1	2.8	26.8	5/7	21/6
Kirton EHS						
Cambridge						
Favourite	3.2	19.1	5.3	27.6	6/7	28/6
Pegasus	5.2	14.6	2.7	22.5	6/7	29/6
Stockbridge House EHS						
Cambridge						
Favourite	2.3	17.4	1.3	21.0	30/6	27/6
Pegasus	4.5	17.9	3.5	25.9	4/7	3/7
Castle Huntley, Scotland						
Cambridge						
Favourite	10.3	8.5	4.0	22.8	9/7	10/7
Pegasus	16.9	9.9	4.1	30.9	11/7	10/7

There was more large Class I fruit of Pegasus than Cambridge Favourite at all sites. Total Class I yields of Pegasus were heavier than those of Cambridge Favourite in three of the four sites in Trial 8.

PLANTS	Moderately vigorous with an upright habit. Pegasus plants have some resistance to Verticillium Wilt but not Red Core. Runner production is adequate.
MARKETING	A possible alternative to Elsanta for the dessert market with more attractive fruit and some disease resistance. However, the fruit flesh is softer than that of Elsanta. There are indications that dessert market outlets will accept Pegasus.
STRENGTHS	Fruit large to medium size of attractive appearance Medium size plants, picking easy Heavy yields of fruit Resistance to Verticillium Wilt
WEAKNESSES	Softer fruit than that of Elsanta Fruit flavour sometimes poor Susceptible to Red Core

STRAWBERRY : EVITA

ORIGIN	Chandler x (Brighton x Gorella). Raised by Edward Vinson Limited, Faversham, Kent and coded 89-A24							
AVAILABILITY	Planting stock is available							
TRIALS	Planted in Strawberry Everbearer Variety Trial 11 at the Brogdale Horticultural Trust							
CROPPING	Fruit - medium to large, conical to wedge shape. The skin is moderately firm and the orange/red flesh firm. Flavour is acid/sweet. Calyx removal is difficult							
SEASON	Perpetual fruiting variety, earlier than Rapella and later than Tango							
YIELD	1993 yield, tonne/ha and 50% harvest date							
	Class I - mm							
	Variety	35+	25-35	Total	Small	Class II	Unmarketable	50%
				18-25mm			harvest	
	Evita	4.3	7.8	12.1	0.8	4.8	5.3	7/8
	Tango	5.8	5.7	11.5	0.6	5.7	22.6	30/7
	(Source - Brogdale Horticultural Trust Everbearer Variety Trial 11: funded by HDC)							
	Evita produced more medium size and less large fruit than Tango. It yielded much less unmarketable fruit than Tango. Fruit of Tango was severely affected by Powdery Mildew, Evita was not. Evita reached 50% harvest date a week after Tango in Everbearer Variety Trial 11							
PLANTS	Moderate in vigour with some resistance to Powdery Mildew. Runner production although adequate in Everbearer Variety Trial 11 has not been in commercial propagation							
MARKETING	Evita produces fruit of good quality. It did not deteriorate appreciably in shelf life tests at Brogdale in 1993. A useful dessert variety for marketing in the late summer/autumn period. Likely to replace Rapella due to its good fruit quality and disease resistance							
STRENGTHS	Acceptable yield of good quality fruit for the late dessert market Fruit and plants have some resistance to Powdery Mildew							
WEAKNESSES	Shy runnering							

NEW VARIETY NOTE - 90

STRAWBERRY : EM227

ORIGIN Honeoye x Hapil. Raised at Horticultural Research International, East Malling. At present grown under its code name EM227. Plant Variety rights do not apply

AVAILABILITY Planting stock is available

TRIALS Planted in Strawberry Variety Trial 41 at the Brogdale Horticultural Trust and in trials on growers holdings

CROPPING Fruit - large to medium in the first year but smaller in the second year of cropping. Shape is globose to conical orange/red with red to orange red flesh. The flesh is moderately firm with a rather insipid flavour. Fruit developed soft patches in shelf life tests. Calyx removal is difficult

SEASON A day or two earlier than Elsanta

YIELD 1992 and 1993 yield, tonne/ha and 50% harvest date

Class I - mm

Variety	1992		1993		1992/3		1992/3		Class II	Unmarketable	Total Yield	50% pick		
	35+	25-35	Total	35+	25-35	Total	Total	Small				1993	1993	1992
EM227	4.1	2.6	6.7	0.4	3.8	4.2	10.9	0.3	3.2	4.6	10.5	12.3	12/6	19/6
Elsanta	4.6	1.5	6.1	1.5	6.8	8.3	14.4	1.4	2.7	4.7	8.6	17.1	13/6	21/6
Honeoye	4.0	1.4	5.4	1.3	6.7	8.0	13.4	1.4	1.4	3.6	7.8	14.3	8/6	14/6

(Source - Brogdale Horticultural Trust Variety Trial 41: funded by HDC)

EM227 yielded less Class I fruit than Elsanta and Honeoye, in Variety Trial 41 in 1993. Yield of these three varieties was reduced by Verticillium Wilt infection in this trial. EM227 was more susceptible to aphid attack than any other variety or selection in the trial.

MARKETING Dessert fruit, a little earlier than Elsanta

STRENGTHS Fruit size large to medium in the first cropping year

WEAKNESSES Plants particularly susceptible to aphid attack
Fruit size small in the second year (plants grown without soil sterilisation or polyethylene mulch)
Shelf life of fruit poor

NEW VARIETY NOTE - 91

STRAWBERRY : MARA DES BOIS

ORIGIN	Raised by Andre Marionnet, France. Plant Variety Rights were granted in November 1992
AVAILABILITY	Planting stock is available
TRIALS	Planted in Strawberry Everbearer Variety Trial 11 at the Brogdale Horticultural Trust
CROPPING	Fruit - medium size, conical to wedge shape. The skin and flesh orange/red to red; moderately firm. Flavour sweet and aromatic. Calyx removal is difficult
SEASON	Perpetual fruiting variety, similar to Rapella and later than Evita
YIELD	1993 yield, tonne/ha and 50% harvest date

Variety	Class I - mm				Class II	Unmarketable	50% Harvest
	35+	25-35	Total 18-25mm	Small			
Mara des Bois	2.0	5.2	7.25	0.7	2.3	4.5	12/8
Evita	4.3	7.8	12.1	0.8	4.8	5.3	7/8

(Source - Brogdale Horticultural Trust Everbearer Variety Trial 11: funded by HDC)

Mara des Bois produced less medium and large size fruit than Evita in Variety Trial 11. It reached 50% harvest date five days after Evita

PLANTS	Moderate in vigour. Commercial experience indicates that runner production is sparse. Results from Everbearer Variety Trial 11 indicated that plants of Mara des Bois were less susceptible to Powdery Mildew than Calypso and Rapella. Mildew was not a problem on the fruit of Mara des Bois in this trial
MARKETING	Mara des Bois produced good quality fruit which did not deteriorate appreciably in shelf life tests at Brogdale in 1993. Although yield was moderate there could be a place for this variety for dessert fruit in the late summer/autumn period.
STRENGTHS	Good quality fruit (particularly flavour) for the late dessert market Less susceptible to mildew, particularly on the fruit, than some perpetual fruiting varieties
WEAKNESSES	Moderate yield, particularly of large fruit Sparse runner production

TYPICAL ANNUAL CROP PROGRAMME FOR STRAWBERRY

CROP DIARY 1993

3 February	Devrinol applied
8 April	Paraquat/diquat applied between beds
13 April	Hand weed and hoe as necessary
23 April	Deblossoming Everbearers commenced
28 April	Paraquat/diquat plus simazine between beds and headlands
5 May	Hoe weed
11 May	Aphox, Rubigan and Elvaron applied
12 May	Deblossoming Everbearers
19 May	Draza applied
23 May	Deblossoming Everbearers
24 May	Rubigan and Elvaron applied
1 June	Hoe between beds and remove runners
3 June	Straw down
4 June	Bravo 500 and erected nets
10 June	Phytoseiulus introduced
17 June	Elvaron and Rubigan to Everbearer Trial. Paraquate/diquat between beds
24 June	Rubigan and Malathion to Everbearers
6 July	Nimrod and Rovral to Everbearers with paraquat/diquat plus codecide to pathways
12 July	Nimrod and Rovral to Everbearers
14 July	Nets to Everbearers
19 July	Nimrod and Rovral to Everbearers
26 July	Malathion and Bavistin to Everbearers
27 July	Post harvest defoliation of main crop plants
28 July	Paraquate/diquat plus codecide between beds
2 August	Bavistin and Spannit to all summer fruiting plants Bavistin to Everbearer Trials
6 August	Handweed and remove runners from Everbearer Trial
25 August	Flowable sulphur and thiodan to summer fruiting plants. Flowable sulphur to Everbearer Trials
27 August	Flowable sulphur plus liquid feed to Everbearer Trial
31 August	Flowable sulphur and thiodan to summer fruiting plants
7 September	Flowable sulphur to all Strawberry plants. Challenge to trial perimeters.

In addition, specific problems have been addressed by the use of:

Roundup - spot application for weed control
 Clout - for couch grass control
 Thiodan - for Tarsonemid mite

Runner removal was by hand.