

Asparagus superclone trial results 1993



A report prepared for the
**Clonal Asparagus Committee of the
New Zealand Asparagus Council**

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Mana Kai Rangahau

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1 EXECUTIVE SUMMARY

This report summarises the 1993 harvest results for the 30 asparagus clones that form the Asparagus Superclone Trial.

The following findings will enable members of the Research Committee of the New Zealand Asparagus Council to identify the best clones based on their performance at four sites.

1. Yield and quality of the asparagus clones measured at each of the four trial sites in the Waikato, Manawatu, Canterbury and Hawke's Bay reflected the seasonal conditions experienced in those areas. Waikato and Manawatu maintained a good season. Both Canterbury and particularly Hawke's Bay recorded a very poor season.
2. The objectives of this additional harvest were to strengthen data available on clonal performance to assist growers in comparing clones as alternatives to seed hybrids and to more clearly identify the top clone(s) for commercialisation. These objectives have been achieved.
3. The average performance of the six best clones - 27, 3, 15, 45, 7 and 16 - at all four sites was 86% better than Jersey Giant (JG), in 1993, compared with 23% in 1992. The data very strongly indicate a consistent year-to-year performance of the top six, both in ranking of export yield above JG, and quality measured on the basis of export grade percentage. Additionally, the highest yielding clones at each of the North Island sites in 1992 held their place in 1993. Unfortunately, they were not established at all sites.
4. There is little to choose from amongst any of the top six, but Clone 16 has ranked sixth in both years and has a substantially lower export percentage than the others, except at Halcombe. Clone 7 is a consistently high yielder, but is a female with a strong purpling tendency and indications of greater than average susceptibility to Stemphyllium. Therefore, neither of these clones could be recommended ahead of the four clones - 27, 3, 15, or 45, in order of priority. The choice among the four clones depends on individual site performance, ease of tissue culturing and ex-flasking.

Table 1: Summary of the performance in 1993 of the clones to considered for commercial release.

| Code | Site | | | | | | | | Purple ² mean |
|-------|---------|-----|--------------------|-----|---------|-----|--------------------|-----|-----------------------------|
| | Waikato | | Halcombe | | Lincoln | | Hastings | | |
| | Export | %JG | Export | %JG | Export | %JG | Export | %JG | |
| 3 | 10.61 | 136 | *3.97 | 326 | 0.56 | 54 | *2.40 | 211 | 1.65 |
| ♀7 | 8.89 | 114 | *3.13 | 257 | *3.10 | 298 | *2.91 | 255 | 2.05 |
| 15 | *12.95 | 166 | 1.14 | 94 | 2.57 | 247 | 2.04 | 179 | 1.89 |
| 16 | 6.88 | 88 | 1.84 | 151 | 0.94 | 90 | 2.20 | 193 | 1.79 |
| 27 | 8.96 | 115 | *2.64 | 216 | 2.76 | 265 | *3.32 | 291 | 1.88 |
| 44 | 4.20 | 54 | 1.05 | 86 | - | - | *4.58 ¹ | 402 | 1.75 |
| 45 | 8.67 | 111 | 0.71 | 58 | 1.46 | 140 | *4.47 | 392 | 1.94 |
| 47 | - | - | *5.40 ¹ | 443 | - | - | - | - | 1.98 |
| JG | 7.81 | 100 | 1.22 | 100 | 1.04 | 100 | 1.14 | 100 | 1.56 |
| UC157 | 5.15 | 66 | 1.24 | 102 | 1.04 | 100 | 1.37 | 120 | 1.35 |

* = Significantly greater than Jersey Giant (P=0.05).

¹ = Highest export yielding clone at that site.

² = Mean of purple score on a scale of 1 = green to 4 = spear purple from butt to tip.

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2 INTRODUCTION

This report presents a summary of the third harvest results of 30 asparagus clones and two standards - Jersey Grant and UC157 grown in four field trial sites - three in the North Island one in the South Island - as part of the Asparagus Superclone Trial.

Data are presented to enable members of the Research Committee of the New Zealand Asparagus Council to identify the best performing clones based on the attributes analysed across sites for commercial release.

3 METHOD

Four clonal trial sites were planted in the Waikato, Manawatu (Halcombe), Hawke's Bay (Hastings) and Canterbury (Lincoln) regions in spring/summer 1989. Preliminary data were collected in 1990 and 1991 to evaluate colour, earliness, spear quality, Stemphyllium resistance and plant numbers. In Spring 1991, the first harvest was conducted for a period of six weeks at three of the trial sites and were presented in confidential report to the Superclone committee in February 1992 (Asparagus superclone trial results 1991 by H Fraser-Kevern and W Jermyn).

In spring 1992, the second harvest was conducted at three sites, and for the first time in Site 4 for 80 days. Results were presented in a confidential report to the Superclone Committee in February 1992 (Asparagus superclone trial results and sensory analysis 1992 by H Fraser-Kevern and W Jermyn).

In spring 1993, the third harvest was conducted for 80 days at all four trial sites and spears were harvested at 230 mm or greater in length and graded. The criteria used for grading in the 1993 season were:

- export number and weight (tight head, > 8 mm in diameter),
- reject number and weight,
- reason for rejecting the spears was assigned a number:
 1. seediness, opening of the spear head
 2. Phytophthora present
 3. Stemphyllium present
 4. colours other than purple
 5. deformed - bent, flat, hollow and small
 6. Fusarium present
 7. weather - frost and wind damage
 8. insect - slugs etc. damage
- purple score: ranging from 1 = green to 4 = purple blush from butt to tip.

4 RESULTS

The start date and length of the harvest season varied over all four trial sites (Table 2). Data for 11 days of the 78-day harvest were lost for the Halcombe trial site. There should, however, be no difference in ranking of the clones. An estimated 0.54 t/ha was calculated from neighbouring production areas over the 11-day period and can be added to trial yield data to give a better idea of total production.

Yield and quality data are summarised in Tables 2-8. In Tables 5, 6, 7 and 8 the criteria presented as grounds for rejection reflect predominant attributes at each site. If a particular attribute was not present, it was not recorded.

Table 2: Harvest dates for the four trial sites (Waikato, Halcombe, Lincoln and Hastings) for 1993.

| Trial site | Start date | Finish date | Length of season (days) |
|------------|--------------|-------------|-------------------------|
| Waikato | 21 September | 17 December | 87 |
| Halcombe | 6 October | 23 December | 78 |
| Lincoln | 4 October | 10 December | 70 |
| Hastings | 29 September | 17 December | 79 |

Table 3: Summary of ranked export yield (t/ha) within each site (Waikato, Halcombe, Lincoln and Hastings) for 1993.

| Waikato | | Manawatu | | Canterbury | | Hastings | |
|---------------|--------|----------|--------|------------|--------|----------|--------|
| Code | Export | Code | Export | Code | Export | Code | Export |
| 12 | 17.28 | 47 | 5.40 | 25 | 3.18 | 44 | 4.58 |
| 15 | 12.95 | 3 | 3.97 | 7 | 3.10 | 45 | 4.47 |
| 3 | 10.61 | 36 | 3.64 | 27 | 2.76 | 27 | 3.32 |
| 27 | 8.96 | 7 | 3.13 | 23 | 2.60 | 7 | 2.91 |
| 7 | 8.89 | 24 | 2.68 | 15 | 2.57 | 3 | 2.40 |
| 45 | 8.67 | 35 | 2.68 | 31 | 1.98 | 16 | 2.20 |
| JG | 7.81 | 27 | 2.64 | 4 | 1.90 | 15 | 2.04 |
| 46 | 7.57 | 20 | 2.62 | 40 | 1.73 | 33 | 1.95 |
| 4 | 7.50 | 46 | 2.54 | 45 | 1.46 | UC157 | 1.37 |
| 16 | 6.88 | 40 | 2.39 | 1 | 1.30 | JG | 1.14 |
| 40 | 6.67 | 43 | 1.93 | 46 | 1.22 | 1 | 0.68 |
| 18 | 5.41 | 16 | 1.84 | UC157 | 1.04 | | |
| 36 | 5.29 | 2 | 1.82 | JG | 1.04 | | |
| UC157 | 5.15 | UC157 | 1.24 | 16 | 0.94 | | |
| 42 | 4.96 | JG | 1.22 | 33 | 0.61 | | |
| 29 | 4.82 | 15 | 1.14 | 3 | 0.56 | | |
| 34 | 4.78 | 44 | 1.05 | | | | |
| 44 | 4.20 | 37 | 1.05 | | | | |
| 28 | 4.11 | 21 | 1.04 | | | | |
| | | 45 | 0.71 | | | | |
| LSD (0.05) | 4.02 | | 1.54 | | 1.24 | | 1.09 |

Note: The significance level (P=0.05) is calculated between clone v. control based on four replicates of a clone.

Table 4: Summary of purple score, % export and mean purple score¹ at four sites (Waikato, Halcombe, Lincoln and Hastings) for 1993.

| Code | Waikato | | Manawatu | | Canterbury | | Hawke's Bay | | Mean purple |
|---------------|---------|-------|----------|-------|------------|-------|-------------|-------|-------------|
| | Purple | %Exp. | Purple | %Exp. | Purple | %Exp. | Purple | %Exp. | |
| JG | 1.51 | 93 | 1.65 | 55 | 1.65 | 59 | 1.42 | 51 | 1.56 |
| UC157 | 1.32 | 91 | 1.38 | 55 | 1.28 | 54 | 1.41 | 55 | 1.35 |
| 1 | | | | | 1.01 | 63 | 1.12 | 41 | 1.07 |
| 2 | | | 1.98 | 50 | | | | | 1.98 |
| 3 | 1.98 | 74 | 1.86 | 69 | 0.99 | 9 | 1.78 | 28 | 1.65 |
| 4 | 2.09 | 82 | | | 1.44 | 53 | | | 1.76 |
| 7 | 2.11 | 89 | 2.37 | 58 | 1.89 | 45 | 1.85 | 51 | 2.05 |
| 12 | 1.89 | 99 | | | | | | | 1.89 |
| 15 | 2.03 | 93 | 2.01 | 51 | 1.70 | 55 | 1.82 | 42 | 1.89 |
| 16 | 1.98 | 40 | 1.79 | 57 | 1.70 | 18 | 1.68 | 24 | 1.79 |
| 18 | 1.86 | 70 | | | | | | | 1.86 |
| 20 | | | 1.97 | 64 | | | | | 1.97 |
| 21 | | | 1.82 | 62 | | | | | 1.82 |
| 23 | | | | | 1.76 | 32 | | | 1.76 |
| 24 | | | 1.21 | 52 | | | | | 1.21 |
| 25 | | | | | 1.31 | 39 | | | 1.31 |
| 27 | 1.76 | 84 | 2.02 | 59 | 1.86 | 26 | 1.87 | 32 | 1.88 |
| 28 | 1.96 | 47 | | | | | | | 1.96 |
| 29 | 1.97 | 57 | | | | | | | 1.97 |
| 31 | | | | | 1.88 | 55 | | | 1.88 |
| 33 | | | | | 1.47 | 34 | 1.27 | 60 | 1.37 |
| 34 | 1.96 | 43 | | | | | | | 1.96 |
| 35 | | | 1.79 | 62 | | | | | 1.79 |
| 36 | 2.07 | 41 | 2.11 | 53 | | | | | 2.09 |
| 37 | | | 1.95 | 54 | | | | | 1.95 |
| 40 | 1.92 | 84 | 1.86 | 56 | 1.71 | 30 | | | 1.83 |
| 42 | 1.69 | 100 | | | | | | | 1.69 |
| 43 | | | 1.76 | 66 | | | | | 1.76 |
| 44 | 1.67 | 71 | 1.92 | 59 | | | 1.65 | 43 | 1.75 |
| 45 | 2.02 | 93 | 1.80 | 57 | 2.00 | 61 | 1.95 | 76 | 1.94 |
| 46 | 1.96 | 65 | 1.95 | 52 | 1.75 | 11 | | | 1.89 |
| 47 | | | 1.98 | 69 | | | | | 1.98 |
| LSD (0.05) | 0.31 | | 0.23 | | 0.24 | | 0.24 | | |

¹ Mean of purple score on a scale of 1 = green to 4 = spear purple from butt to tip.

Table 5: Reasons for rejecting spears for the Waikato site 1993, expressed as a percentage of the total number of rejected spears at the Waikato site.

| Code | Reasons for rejection | | | | | | |
|-------|-----------------------|----------------------|---------------------|--------------------|-----------------------|---------------------|---------------------|
| | Open | Deform. ¹ | Phyto. ² | Stem. ³ | Weather. ⁴ | Insect ⁵ | Colour ⁶ |
| 29 | 99 | 1 | | | | 1 | |
| 28 | 96 | 1 | 3 | | | | |
| 34 | 95 | 1 | 4 | | | | |
| 16 | 92 | 1 | 6 | | 1 | | |
| 3 | 90 | 5 | 5 | | | | |
| 46 | 90 | 2 | 7 | | 2 | | |
| 44 | 90 | 11 | | | | | |
| 36 | 88 | 1 | 7 | 4 | | | |
| 18 | 88 | 9 | 3 | | | | |
| 40 | 87 | 8 | 2 | | 2 | | |
| 27 | 79 | 15 | 3 | | 2 | | |
| 12 | 79 | 21 | | | | | |
| 15 | 75 | 13 | 9 | 2 | 2 | | |
| UC157 | 68 | 22 | 5 | 3 | 3 | 1 | |
| 4 | 63 | 23 | 13 | | 2 | | |
| 7 | 61 | 19 | | 11 | 3 | 1 | 5 |
| 42 | 50 | | | | 50 | | |
| 45 | 36 | 52 | | | 10 | 3 | |
| JG | 32 | 33 | 1 | | 5 | | |

Note: percentages are rounded up to whole numbers.

¹ Deformed - bent, flat, hollow and small.

² Phytophthora present.

³ Stemphyllium present.

⁴ Weather - frost and wind damage.

⁵ Insects - slugs etc. damage.

⁶ Colour - other than purple.

Table 6: Reasons for rejecting spears for the Halcombe site 1993, expressed as a percentage of the total number of the rejected spears at the Halcombe site.

| Code | Reasons for rejection | | | | | | |
|-------|-----------------------|----------------------|---------------------|--------------------|----------------------|---------------------|-----------------------|
| | Open | Deform. ¹ | Phyto. ² | Stem. ³ | Weather ⁴ | Insect ⁵ | Fusarium ⁶ |
| 16 | 38 | 48 | 1 | 7 | 6 | | |
| 46 | 36 | 45 | 1 | 9 | 8 | 2 | |
| 2 | 33 | 40 | 1 | 19 | 6 | 1 | |
| 36 | 30 | 48 | | 13 | 8 | 1 | |
| 44 | 28 | 39 | 5 | 17 | 9 | 1 | |
| 24 | 26 | 40 | 1 | 17 | 9 | 6 | |
| 38 | 21 | 51 | 3 | 23 | 3 | | |
| 43 | 21 | 62 | 1 | 14 | | 2 | |
| 35 | 21 | 62 | | 14 | 3 | | |
| 27 | 20 | 57 | | 14 | 9 | 1 | |
| 15 | 19 | 57 | 1 | 8 | 12 | 3 | |
| 40 | 18 | 55 | 1 | 16 | 9 | 1 | |
| 3 | 10 | 70 | | 13 | 4 | 1 | 2 |
| 20 | 10 | 70 | | 12 | 5 | 3 | |
| JG | 6 | 64 | 1 | 20 | 9 | 1 | |
| 21 | 5 | 54 | | 27 | 13 | 2 | |
| UC157 | 3 | 67 | 1 | 19 | 9 | 2 | |
| 47 | 3 | 63 | 1 | 19 | 10 | 4 | |
| 7 | 2 | 67 | | 20 | 5 | 5 | |
| 45 | 2 | 66 | | 24 | 9 | | |

Note: percentages are rounded up to whole numbers.

¹ Deformed - bent, flat, hollow and small.

² Phytophthora present.

³ Stemphylium present.

⁴ Weather - frost and wind damage.

⁵ Insects - slugs etc. damage.

⁶ Fusarium present.

Table 7: Reasons for rejecting spears for the Lincoln site 1993, expressed as a percentage of the total number of rejected spears at the Lincoln site.

| Code | Reasons for rejection | | | | | | |
|-------|-----------------------|----------------------|---------------------|--------------------|------------------------|---------------------|---------------------|
| | Open | Deform. ¹ | Phyto. ² | Stem. ³ | Fusarium. ⁴ | Colour ⁵ | Insect ⁶ |
| 46 | 99 | | 1 | | | | |
| 16 | 99 | 1 | | | | | |
| 25 | 95 | 3 | | | 2 | | |
| 3 | 93 | 7 | | | | | |
| 27 | 92 | 4 | | 4 | | | |
| 4 | 92 | 6 | | | | | 2 |
| 45 | 90 | 7 | 3 | | | | |
| 23 | 83 | 11 | 3 | | 4 | | |
| 15 | 78 | 21 | | | 1 | | |
| 40 | 75 | 25 | | | | | |
| 33 | 74 | 21 | | | 5 | | |
| JG | 71 | 24 | | | 4 | | |
| 7 | 71 | 29 | | | | | |
| 1 | 67 | 28 | | | 1 | 4 | |
| 31 | 65 | 35 | | | | | |
| UC157 | 47 | 43 | | | 11 | | |

Note: Percentages are rounded up to whole numbers.

¹ Deformed - bent, flat, hollow and small.

² Phytophthora present.

³ Stemphyllium present.

⁴ Fusarium present.

⁵ Colour other than purple.

⁶ Insect - slugs etc. damage.

Table 8: Reasons for rejecting spears for the Hastings site 1993, expressed as a percentage of the total number of rejected spears at the Hastings site.

| Code | Reason for rejection | | |
|-------|----------------------|-----------------------|---------------------------|
| | Open ¹ | Deformed ² | Phytophthora ³ |
| 1 | 49 | 51 | |
| 3 | 94 | 6 | |
| 7 | 52 | 48 | |
| 15 | 96 | 4 | |
| 16 | 98 | 0 | 2 |
| 27 | 99 | 1 | |
| 33 | 70 | 30 | |
| 44 | 96 | 4 | |
| 45 | 82 | 18 | |
| UC157 | 57 | 43 | 1 |
| JG | 57 | 44 | |

Note: percentages are rounded up to whole numbers.

¹ Seediness, opening of the spear head.

² Deformed - bent, flat, hollow and small.

³ Phytophthora present.

5 DISCUSSION

The results presented in this report confirm the advantages and consistency of a number of previously identified clones compared with Jersey Giant over a range of seasons and conditions.

Data provide a basis for discussion by the Clonal Asparagus Committee.