

## PROCESSORS &amp; GROWERS RESEARCH ORGANISATION

Evaluation of the resistance of pea cultivars to powdery mildew (*Erysiphe pisi*)

1993

**SUMMARY:** In a late season field trial, 27 commercial pea cultivars were compared for their relative resistance to powdery mildew (*Erysiphe pisi*). Of these 9 cultivars, mainly established fresh-market types, were susceptible. Foliar infection normally occurred at the onset of flowering and resulted in high levels of diseased pods by the time these had reached the picking stage. All remaining cultivars were disease free by harvest.

**OBJECT:** To evaluate a range of commercially available pea cultivars for their relative susceptibility to powdery mildew (*Erysiphe pisi*).

**METHOD:** A range of 27 commercial cultivars, including standard fresh market types, were grown as a late season field trial on the PGRO trial ground at Thornhaugh, Cambridgeshire. The soil type was a fine sandy clay loam, pH 8.1. The seed was drilled using an Oyjord plot drill on 23rd June 1993 into plots measuring 2 m wide, each split into 4 rows of two cultivars, and 4 m in length. Two replicates of each cultivar were planted. Disease development was monitored regularly and assessments made at specific crop growth stages for each cultivar. Mildew assessments were made on a whole plot basis and recorded by estimating the percentage leaf area infected by disease. At the picking stage measurements were made, on individual plants, for haulm and pod length, together with the final percentage pod area infected by disease.

**RESULTS:** Mildew development was first noted on the 3rd August in seven of the cultivars (Early Onward, Progress No. 9, Feltham First, Kelvedon Wonder, Daybreak, Meteor and Hurst Green Shaft) which, with the exception of Hurst Green Shaft, had reached the green-cream bud stage of crop development (GS 201 - 202). Subsequent disease spread was rapid with 9 of the 27 cultivars exhibiting disease symptoms, some with almost 100% cover by the picking stage (Table 1). Since the range of varietal maturity varied considerably over the period of disease recordings these were, for convenience, grouped into pre-flowering, flowering, early and later pod development stages. Assessment dates for each set of observations were 6th, 10th, 16th and 20th August for leaf disease records and 24th, 27th and 31st August, 1st, 2nd, 3rd, 6th, 8th, 9th and 10th September for the final picking stage assessments. *Mycosphaerella pinodes* infection was also noted and final percentage infection per plot was recorded and is included in Table 1. Figures for haulm and pod length assessments are shown in Table 2.



Table 1 - Powdery mildew disease assessments

| Cultivar              | Mean % mildew infection |                      |            |                     |      |                                    |
|-----------------------|-------------------------|----------------------|------------|---------------------|------|------------------------------------|
|                       | Pre-flower              | % leaf area affected |            | % pod area affected |      | % plot area with <i>M. pinodes</i> |
|                       |                         | Flower               | Early pods | Later pods          |      |                                    |
| <u>Earlies</u>        |                         |                      |            |                     |      |                                    |
| Daybreak              | -                       | 16                   | 50         | 68                  | 95   | 7.5                                |
| Early Onward          | 19.9                    | 16.7                 | 35         | -                   | 74   | 10                                 |
| Feltham First         | -                       | 23                   | -          | 51.1                | 77   | 10                                 |
| Holiday               | 0                       | 0                    | 0          | 0                   | 0    | 12.5                               |
| Kelvedon Wonder       | 6.7                     | 14                   | 26.7       | 56.7                | 84   | 7.5                                |
| Meteor                | -                       | 13.5                 | 40         | 61.7                | 88.5 | 13.4                               |
| Progress No. 9        | 21.4                    | 33                   | 53.3       | 53.3                | 77   | 11.7                               |
| Solist                | 0                       | 0                    | 0          | 0                   | 0    | 5                                  |
| Sugar Bon*            | 0                       | 0                    | 0          | 0                   | 0    | 7.5                                |
| <u>Early Maincrop</u> |                         |                      |            |                     |      |                                    |
| Ambassador            | 0                       | 0                    | 0          | 0                   | 0    | 9.2                                |
| Encore                | 0                       | 0                    | 0          | 0                   | 0    | 38.3                               |
| Quantum               | 8                       | 23.3                 | 30         | -                   | 94   | 30                                 |
| <u>Maincrop</u>       |                         |                      |            |                     |      |                                    |
| CMG 282F              | 0                       | 0                    | 0          | 0                   | 0    | 15                                 |
| Hurst Green Shaft     | 9.8                     | 16.1                 | 31.7       | -                   | 80   | 23.4                               |
| Kodiak                | 0                       | 0                    | 0          | 0                   | 0    | 6.7                                |
| Laser                 | 0                       | 0                    | 0          | 0                   | 0    | 53.4                               |
| Marlin                | 0                       | 0                    | 0          | 0                   | 0    | 45                                 |
| Novella II            | 0                       | 0                    | 0          | 0                   | 0    | 60                                 |
| Onward                | 9.2                     | 26.4                 | 30         | -                   | 98.5 | 18.3                               |
| Oregon Sugar Pod#2*   | 0                       | 0                    | 0          | 0                   | 0    | 7.5                                |
| PW624-2-1-2           | 0                       | 0                    | 0          | 0                   | 0    | 35                                 |
| Quad                  | 0                       | 0                    | 0          | 0                   | 0    | 16.7                               |
| Twiggy                | 0                       | 0                    | 0          | 0                   | 0    | 46.7                               |
| WAV 675               | 0                       | 0                    | 0          | 0                   | 0    | 23.4                               |
| <u>Late</u>           |                         |                      |            |                     |      |                                    |
| Almota                | 0                       | 0                    | 0          | 0                   | 0    | 11.7                               |
| Athena                | 0                       | 0                    | 0          | 0                   | 0    | 38.3                               |
| WAV 785               | 0                       | 0                    | 0          | 0                   | 0    | 35                                 |

\* Edible podded cultivars



Table 2 - Growth measurements

| Cultivar              | Mean haulm length (cm) | Mean pod length (cm) |
|-----------------------|------------------------|----------------------|
| <u>Earlies</u>        |                        |                      |
| Daybreak              | 68.5                   | 7.75                 |
| Early Onward          | 69.1                   | 9.23                 |
| Feltham First         | 60.3                   | 8.88                 |
| Holiday               | 64                     | 11.83                |
| Kelvedon Wonder       | 59                     | 8.05                 |
| Meteor                | 54.5                   | 8.15                 |
| Progress No. 9        | 52                     | 9.78                 |
| Solist                | 74                     | 8.03                 |
| Sugar Bon             | 60.8                   | 8.18                 |
| <u>Early Maincrop</u> |                        |                      |
| Ambassador            | 88                     | 7.83                 |
| Encore                | 57.6                   | 7.98                 |
| Quantum               | 59.2                   | 7.36                 |
| <u>Maincrop</u>       |                        |                      |
| CMG 282F              | 67.5                   | 6.9                  |
| Hurst Green Shaft     | 81                     | 10.63                |
| Kodiak                | 68.3                   | 8.53                 |
| Laser                 | 60.1                   | 7.9                  |
| Marlin                | 63.6                   | 6.98                 |
| Novella II            | 46.5                   | 7.4                  |
| Onward                | 65.3                   | 8.9                  |
| Oregon Sugar Pod#2    | 88.6                   | 9.83                 |
| PW624-2-1-2           | 60.4                   | 10.65                |
| Quad                  | 64.3                   | 6.85                 |
| Twiggy                | 66.3                   | 7.3                  |
| WAV 675               | 66.6                   | 7.48                 |
| <u>Late</u>           |                        |                      |
| Almota                | 75.2                   | 8.55                 |
| Athena                | 69                     | 7.95                 |
| WAV 785               | 57.9                   | 7.28                 |

**CONCLUSIONS:** Due to the late drilling of the trial, and the hot, dry weather conditions during late June and early July, mildew developed readily on all susceptible cultivars. In all cases foliar disease spread resulted in a high percentage of the pods becoming infected by the picking stage. In general disease susceptibility appeared to be restricted to early maturing types of the older, well established cultivars, with newer types showing good resistance to mildew infection. Some of the newer mildew resistant cultivars may possess suitable agronomic qualities for the fresh market sector although, due to the time of sowing, features such as plant height and pod length may not have been typical.

Varietal resistance to powdery mildew is most important in maincrop cultivars, for with late peas this disease can be the factor that limits the length of harvesting. Here the resistance of the new cultivars compared to the standards Onward and Hurst Green Shaft could provide additional cropping opportunities for growers. The resistance of the two edible podded peas is also noteworthy since successful marketing of this produce depends upon the pods being healthy and blemish-free.



A considerable degree of variation between cultivars was also noted in their relative susceptibility to infection with *Mycosphaerella pinodes*; with very high levels being found particularly in the maincrop types.

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| Cultivar              | Mean % mildew infection |        |            |            |                      | % pod area affected | % plot area with <i>M. pinodes</i> |
|-----------------------|-------------------------|--------|------------|------------|----------------------|---------------------|------------------------------------|
|                       | Pre-flower              | Flower | Early pods | Later pods | % leaf area affected |                     |                                    |
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| Solist                | 0                       | 0      | 0          | 0          |                      | 0                   | 5                                  |
| Sugar Bon*            | 0                       | 0      | 0          | 0          |                      | 0                   | 7.5                                |
| <u>Early Maincrop</u> |                         |        |            |            |                      |                     |                                    |
| Ambassador            | 0                       | 0      | 0          | 0          |                      | 0                   | 9.2                                |
| Encore                | 0                       | 0      | 0          | 0          |                      | 0                   | 38.3                               |
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| Novella II            | 0                       | 0      | 0          | 0          |                      | 0                   | 60                                 |
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| PW624-2-1-2           | 0                       | 0      | 0          | 0          |                      | 0                   | 35                                 |
| Quad                  | 0                       | 0      | 0          | 0          |                      | 0                   | 16.7                               |
| Twiggy                | 0                       | 0      | 0          | 0          |                      | 0                   | 46.7                               |
| WAV 675               | 0                       | 0      | 0          | 0          |                      | 0                   | 23.4                               |
| <u>Late</u>           |                         |        |            |            |                      |                     |                                    |
| Almota                | 0                       | 0      | 0          | 0          |                      | 0                   | 11.7                               |
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