

# Broccoli Downy Mildew Trials

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## INTRODUCTION

Downy mildew is a major concern of broccoli growers in the Yuma area. The disease is usually more prevalent in the early plantings from late August to mid-September; it occurs in the fall while the weather is still warm. Although the disease usually first appears on the foliage, it can cause damage on the head if not properly controlled.

According to the Yuma County Vegetable Crop Budgets, growers spend approximately \$50 per acre for control of downy mildew. Breeders are endeavoring to produce varieties that tolerate downy mildew, while still retaining their desirable quality characteristics. With 3,000 acres of broccoli grown in Yuma County, the potential savings of eliminating chemical control of downy mildew could approach \$150,000.

## METHODS AND MATERIALS

A trial of 28 varieties was planted at the Yuma Valley Agricultural Center where they could be grown without the use of fungicides. The broccoli was planted on September 9, 1986, in double rows on 40-inch beds and thinned to a 6-7 inch spacing between plants. The plots consisted of a single bed 15 feet long replicated 4 times in a randomized complete block design.

A later planting with a grower cooperator on September 26, 1986, had an adequate amount of disease present to make an evaluation. The plants were in double rows on 40-inch beds, thinned to a 6-7 inch spacing. The plots were 20 feet long and unreplicated.

## RESULTS AND DISCUSSION

In the trial at the Yuma Valley Agricultural Center, the only statistically significant differences were between Citation (Harris-Moran) and PSR 20784 (Petoseed), which showed tolerance to downy mildew, and Emperor (Northrup King) which was very susceptible; however, Emperor produced a high-quality crop. Table 1 lists the varieties in order, beginning with the most tolerant.

The two numbered varieties 55-452 (Takii) and Exp 83-1 (Sakata) in the later grower cooperator trial had high potential. Both received the top rating for downy mildew tolerance and also had an overall rating of 2 for quality characteristics. Liberty also received a rating of 1 for downy mildew tolerance, but only a 3 for overall quality. Three varieties received a rating of 2 for both quality and downy mildew tolerance: Citation (Harris-Moran), 57-411 (Takii) and NS 658 (Neuman). An evaluation of all the varieties in the second trial is provided in Table 2.

Table 1. Comparison of broccoli varieties for tolerance to downy mildew from the September 9, 1986, planting at the Yuma Valley Agricultural Center.

Variety	Mean Scores of 4 Replications (a)
Citation (Harris-Moran)	2.0 a *
PSR 20784 (Petoseed)	2.1 a
Exp 83-1 (Sakata)	2.3 ab
Nancy (Quali-Sel)	2.3 ab
Cindy (Quali-Sel)	2.4 ab
NS 649 (Neuman)	2.4 ab
PSR 20684 (Petoseed)	2.4 ab
HMX 4138 (Harris-Moran)	2.5 ab
Galaxy (Asgrow)	2.5 ab
Packman (Petoseed)	2.5 ab
Exp 19 (Sakata)	2.5 ab
HMX 4137 (Harris-Moran)	2.6 ab
Cruiser (Royal Sluis)	2.6 ab
Sprinter/77 (Sakata)	2.8 ab
NS 659 (Neuman)	2.8 ab
90 B (Takii)	2.8 ab
Exp 12 (Sakata)	2.8 ab
NS 660 (Neuman)	2.9 ab
57-402 (Takii)	2.9 ab
Green Duke (Northrup King)	2.9 ab
NS 658 (Neuman)	2.9 ab
T-368 (Takii)	2.9 ab
Premium Crop (Takii)	2.9 ab
Commander (Northrup King)	2.9 ab
101 (ARCO)	3.0 ab
57-408 (Takii)	3.0 ab
T-637 (Takii)	3.0 ab
Emperor (Northrup King)	3.3 b

(a) 1 = tolerance, 5 = susceptible

\* Yields followed by the same letter are not statistically different from one another at the 5% level using the Student-Newman-Keuls Test for comparison of multiple means.

Table 2. Comparison of broccoli varieties for tolerance to downy mildew from the grower cooperator trial of September 26, 1986.

Variety	Downy Mildew Tolerance (a)	Overall Evaluation (a)
Exp 83-1 (Sakata)	1	2
55-452 (Takii)	1	2
Liberty (Quali-Sel)	1	3
Citation (Harris-Moran)	2	2
NS 658 (Neuman)	2	2
57-411 (Takii)	2	2
Challenger (Quali-Sel)	2	3
Skiff (Royal Sluis)	2	3
PSR 20784 (Petoseed)	2	3
Commander (Northrup King)	3	1
Emperor (Northrup King)	3	1
PSR 20684 (Petoseed)	3	1
Chancellor (Northrup King)	3	2
Cruiser (Royal Sluis)	3	2
Green Belt (Sakata)	3	2
AVX 8010 (Sunseed)	3	2
Exp 12 (Sakata)	3	2
HMX 4137 (Harris-Moran)	3	2
HMX 6139 (Harris-Moran)	3	2
NS 659 (Neuman)	3	2
NS 660 (Neuman)	3	2
T-637 (Takii)	3	2
HMX 4138 (Harris-Moran)	3	3
HMX 6141 (Harris-Moran)	3	3
T-368 (Takii)	3	3
57-408 (Takii)	3	3
101 (ARCO)	3	3
AVX 8005 (Sunseed)	3	4
AVX 8009 (Sunseed)	3	4
Exp 19 (Sakata)	4	2
58-528 (Takii)	4	2
Green Defender (Abbott & Cobb)	4	3
Green Duke (Northrup King)	4	3
Sprinter (Sakata)	4	3
Kwik Green (Abbott & Cobb)	5	4

(a) 1 =most tolerant or desirable, 5=most susceptible or undesirable