Early blight, incited by the foliage blight phase and a high level of resistance to the stem lesion phase (collar rot) of early blight, incited by Alternaria solani (Ellis and Martin) Jones and Grout.

**Origin**

‘Mountain Supreme’ is the F₁ hybrid of NC EBR-3 × NC EBR-4 (Fig. 1). The early blight-resistant parental lines were developed by pedigree breeding. Initial sources of resistance were Campbell 1943 (C1943) and H. lirsutum Humb. and Bonpl. P1. 126445. Two previous early blight-resistant releases, NC EBR-1 and NC EBR-2 (Gardner, 1988), in the pedigree of NC EBR-3 derived their resistances from P1. 126445 and C1943, respectively. NC EBR-4 has resistance derived from a cross involving NC EBR-1 and a line, 823(X)-1-3, in common with NC EBR-3, tracing back to C1943 (Fig. 1). Development of NC EBR-3 and EBR-4 involved a combination of field screening for foliar resistance and greenhouse screening for stem resistance (Gardner, 1990).

**Description**

**NC EBR-3.** The plant type of NC EBR-3 is determinate (sp) (Mutschler et al., 1987), similar in size and other growth characteristics to that of ‘Flora-Dade’. Nonripe fruit are uniformly light green (u). Fruit are deep blue to flattened globe, are symmetrical and have a small blossom scar. Fruit pedicels are jointless. NC EBR-3 is later in maturity, similar in fruit weight and nongraded yield, and higher in yield in U.S. combination grade fruit than is ‘Flora-Dade’ (Table 1). NC EBR-3 (28% ± 9%) and NC EBR-4 (19% ± 5%) showed significantly less (P = 0.05) defoliation than did ‘Flora-Dade’ (74% ± 8%). NC EBR-3 is highly resistant to the stem lesion phase of early blight (Table 2). In addition to early blight resistance, NC EBR-3 is resistant (I and I-2 genes) to races 1 and 2 of Fusarium oxysporum f.sp. lycopersici (Sacc. ) Snyd. and Hans., and resistant (Ve gene) to race 1 of Verticillium dahliae Kleb. Fruit are highly resistant to radial and concentric cracking and to weather check (fine cuticle cracks).

**NC EBR-4.** The plant type of NC EBR-4 is determinate (sp) with dense foliage cover. Fruit are deep blue and symmetrical and have a small blossom scar. Nonripe fruit are uniformly light green (u). Fruit pedicels are jointed. NC EBR-4 is later in maturity, similar in fruit weight and nongraded yield, and higher in yield in U.S. combination grade fruit than is ‘Flora-Dade’ (Table 1).

In addition to its moderate resistance to the foliage blight phase of early blight, NC EBR-4 is highly resistant to the stem lesion phase of early blight (Table 2). Like NC EBR-3, NC EBR-4 is resistant (I gene) to race 1 of F. oxysporum f.sp. lycopersici and (Ve gene) to race 1 of V. dahliae, and fruit are highly resistant to radial and concentric fruit cracking and to weather check.

**Mountain Supreme.** The plant type of ‘Mountain Supreme’ is determinate (sp), and the vines are vigorous. Plant height is slightly less than that of ‘Mountain Pride’ (Gardner, 1982). Foliage cover is adequate for good fruit protection against weather-related defects but is less dense than that of ‘Mountain Pride’.

Fruit of ‘Mountain Supreme’ are deep blue and symmetrical and have a small blossom scar. Nonripe fruit are uniformly light green (u) and have a glossy finish. Fruit pedicels are jointed. Fruit ripen to a uniform, glossy red exterior color. Some interior white tissue has been observed, but incidence of this defect has not exceeded that of the standard cultivar ‘Sunny’. ‘Mountain Supreme’ is resistant to radial and concentric fruit cracking and to weather check. Flavor of ‘Mountain Supreme’ is comparable with that of currently used cultivars (subjective rating). Fruit are firm in the ripe stage and withstand handling well during harvest and packing. ‘Mountain Supreme’ is slightly later maturing than are ‘Mountain Pride’ and ‘Sunny’ (Table 1). Fruit weight is comparable to that of ‘Flora-Dade’ and less than that of other currently used cultivars.

**Additional index words.** Lycopersicon esculentum, Alternaria solani

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**Table 1.** Comparison of ‘Mountain Supreme’, NC EBR-3, and NC EBR-4 with standard tomato cultivars in staked, vine-ripe harvest trials at Fletcher, N.C.

| Cultivar/selection | Early season yield (g) | Total season yield (g) | Fruit weight (g) |
|--------------------|------------------------|------------------------|-----------------|
|                    | Nongraded | U.S. combination grade |                  |
| Mountain Supreme   | 20        | 108                    | 82              | 221          |
| Mountain Delight   | 24        | 102                    | 55              | 285          |
| Mountain Pride     | 26        | 104                    | 60              | 266          |
| Sunny              | 31        | 107                    | 46              | 245          |
|                    | 5         | 9                      | 12              |              |
| NC EBR-3           | 21        | 96                     | 67              | 210          |
| NC EBR-4           | 15        | 87                     | 66              | 227          |
| Flora-Dade         | 22        | 95                     | 45              | 213          |
|                    | 7         | 12                     | 9               |              |

*Based on eight replicated trials conducted over a 5-year period (1990–94).

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In trials using a conventional 5-d fungicide spray schedule, ‘Mountain Supreme’ had total nongraded yield over a 5-year period equivalent to ‘Mountain Pride’ but exceeded other cultivars in percentage U.S. combination grade (U.S. No. 1 + U.S. No. 2) fruit, resulting in significantly higher yield of U.S. combination grade fruit (Table 1).

Table 2. Early blight stem lesion ratings of tomato plants inoculated in a greenhouse (1994).

| Cultivar/selection | Rating |
|--------------------|--------|
| Flora-Dade         | 3.5    |
| NC EBR-3           | 1.3    |
| NC EBR-4           | 1.7    |
| LSD<sub>0.05</sub> | 0.6    |

<sup>5</sup> Five-week-old plants were inoculated by spraying stems with a suspension of conidia of <em>Alternaria solani</em> (10<sup>4</sup> spores/mL) and incubating in a chamber with mist applied at night. Ratings were made 10 d after inoculation.

<sup>6</sup> Ratings based on diameter of lesions: 1 = <1 mm (pinpoint flecks); 2 = 1–2 mm; 3 = 2–3 mm; 4 = >3 mm.

In a trial comparing different fungicide application intervals in western North Carolina, ‘Mountain Supreme’ produced total yields equivalent to ‘Mountain Pride’ but exceeded ‘Mountain Pride’ in yields of U.S. combination grade fruit when the spray interval was longer than the recommended 5-d interval (Table 3). Results of this study indicate that the spray interval for ‘Mountain Supreme’ can be extended from 5 to 10 d under conditions highly favorable for early blight and still maintain control of the disease.

‘Mountain Supreme’ was evaluated (1988–92) in the Southern Tomato Exchange Program (STEP) trials as STEP 714. In STEP replicated trials (1990–92), it exceeded the control cultivar Flora-Dade in marketable yield at most locations and was rated superior to ‘Flora-Dade’ in fruit appearance. In numerous grower plantings in western North Carolina, reaction to ‘Mountain Supreme’ has been favorable because of its high yields of smooth, blemish-free fruit and low incidence of early blight.

Table 3. Comparison of ‘Mountain Supreme’ and ‘Mountain Pride’ tomatoes at different fungicide spray intervals in a staked, vine-ripe harvest trial at Fletcher, N.C. (1989).

| Spray interval (days) | Defoliation by early blight (%)<sup>1</sup> | Yield (t·ha<sup>–1</sup>) | U.S. combination grade<sup>1</sup> |
|----------------------|-------------------------------------------|--------------------------|-----------------------------------|
| Mountain Supreme     |                                           |                          |                                   |
| 5                    | 7                                         | 98                       | 56                                |
| 7                    | 11                                        | 108                      | 59                                |
| 10                   | 13                                        | 103                      | 56                                |
| No spray             |                                            |                          |                                   |
| Mountain Pride       |                                           |                          |                                   |
| 5                    | 15                                        | 99                       | 45                                |
| 7                    | 42                                        | 92                       | 39                                |
| 10                   | 60                                        | 89                       | 30                                |
| No spray             |                                            | 73                       | 20                                |
| LSD<sub>0.05</sub>   |                                            | 11                       | 12                                |

<sup>1</sup> Rated 100 d after transplanting 5-week-old plants to the field.

<sup>2</sup> U.S. No. 1 + U.S. No. 2 grade fruit.