PA-566, A Root-knot Nematode-resistant, Pimento-type Pepper

Richard L. Fery and Judy A. Thies

U.S. Department of Agriculture, Agricultural Research Service, U.S. Vegetable Laboratory, 2700 Savannah Highway, Charleston, SC 29414-5334

Additional index words. Capsicum annuum, Meloidogyne, pepper breeding

PA-566 is a new pimento-type pepper (Capsicum annuum L.) released 30 Apr. 2010 by the Agricultural Research Service of the U.S. Department of Agriculture. PA-566 is the product of a backcross breeding program to incorporate the N root-knot nematode resistance gene into a ‘Pimiento L’-type genetic background. ‘Pimiento L’ is a root-knot nematode-susceptible, pimento-type cultivar that is widely grown in the southern states where it can produce good yields under high-temperature conditions. The dominant N gene conditions a high level of resistance to the southern root-knot nematode [Meloidogyne incognita (Chitwood) Kofoid and White], the peanut root-knot nematode [M. arenaria (Neal) Chitwood], and the tropical root-knot nematode [M. javanica (Treub) Chitwood]. The release of PA-566 will provide pepper breeders interested in developing both open-pollinated and F1 hybrid pimento-type cultivars access to a near-cultivar quality genetic backcross of ‘Pimiento L’, a root-knot nematode-resistant, pimento-type pepper advance breeding line PA-566.

**Origin**

In 2000, a recurrent backcross breeding procedure was initiated to incorporate the dominant root-knot nematode resistance gene (N) into a ‘Pimiento L’-type genetic background (Fig. 1). The donor parent was ‘Mississippi Nemahart’ and the recurrent parent was ‘Pimiento L’. ‘Mississippi Nemahart’ is a root-knot nematode-resistant, pimento-type cultivar that was released by Mississippi State University in 1966 (Ferry and Dukes, 1996; Hare, 1957, 1966). ‘Pimiento L’ was introduced by the Petosed Company in the late 1960s; it is susceptible to root-knot nematodes. The ‘Pimiento L’ accession that was used as the recurrent parental line for the current release was obtained from Willhite Seed, Inc. (Poolville, TX). PA-566 was derived from a single BC3F2 plant grown in 2005.

---

**Table 1.** Average plant height, plant width, days to harvest, and marketable fruit yield for the root-knot nematode-resistant, pimento-type breeding line PA-566 and the root-knot nematode-susceptible pimento-type cultivar Pimiento L grown in three separate trials at Charleston, SC, 2007–2009.¹

<table>
<thead>
<tr>
<th>Trial/pepper</th>
<th>Accession</th>
<th>Plant ht (cm)</th>
<th>Plant width (cm)</th>
<th>Days to harvest (no.)</th>
<th>Marketable fruit yield (kg·ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial I</td>
<td>PA-566</td>
<td>48.8 a¹</td>
<td>60.5 a</td>
<td>79.7 a</td>
<td>11,231 a</td>
</tr>
<tr>
<td></td>
<td>Pimiento L</td>
<td>49.5 a</td>
<td>60.3 a</td>
<td>82.0 a</td>
<td>12,303 a</td>
</tr>
<tr>
<td>Trial II</td>
<td>PA-566</td>
<td>37.7 a</td>
<td>49.7 a</td>
<td>71.2 a</td>
<td>12,282 b</td>
</tr>
<tr>
<td></td>
<td>Pimiento L</td>
<td>39.5 a</td>
<td>50.8 a</td>
<td>71.2 a</td>
<td>15,077 a</td>
</tr>
<tr>
<td>Trial III</td>
<td>PA-566</td>
<td>—</td>
<td>—</td>
<td>85.6 a</td>
<td>11,014 b</td>
</tr>
<tr>
<td></td>
<td>Pimiento L</td>
<td>—</td>
<td>—</td>
<td>80.3 a</td>
<td>16,636 a</td>
</tr>
<tr>
<td>Combined analysis of all trials</td>
<td>PA-566</td>
<td>41.9 a NS</td>
<td>53.7 a NS</td>
<td>78.4 a NS</td>
<td>11,573 b*</td>
</tr>
<tr>
<td></td>
<td>Pimiento L</td>
<td>43.3 a</td>
<td>54.4 a</td>
<td>77.1 a</td>
<td>14,700 a</td>
</tr>
</tbody>
</table>

¹ The experimental design of each trial was a randomized block complete with six (Trial I), nine (Trial III), or 10 (Trial II) replications. Single-row plots were used for all trials (10 plants/plot, 30 cm between plants, and 102 cm between rows). All trials were established using transplants; Trial I was planted on 2 May 2007, Trial II was planted on 6 May 2008, and Trial III was planted on 25 June 2009. Trial I was harvested five times (16 July 2007 to 14 Aug. 2007), and Trials II and III were each harvested six times (15 July 2008 to 19 Aug. 2008 and 9 Sept. 2009 to 20 Oct. 2009, respectively).

² Mean separation within columns and trials by Student-Newman-Keuls multiple range test, P ≤ 0.05 ns, *Non-significant or significant interaction between accession and trial at P ≤ 0.05.
Thies, J.A. and R.L. Fery. 2000. Characterization of the southern root-knot nematode-resistant F1 hybrids. PA-566 is a relatively well-adapted, pimento-type pepper and is potentially useful in commercial production without further development. It is particularly recommended for trial for appropriate recognition of source be given when this germplasm contributes to research or development of a new breeding line or cultivar.

**Availability**

Small seed samples of PA-566 are available from the senior author for distribution to all interested research personnel and bona fide pepper seed producers. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including the development and commercialization of new cultivars. It is requested that appropriate recognition of source be given when this germplasm contributes to research or development of a new breeding line or cultivar.

**Literature Cited**


Hare, W.W. 1966. New pimiento is resistant to nematodes. Mississippi Farm Res. 29:1.8.


