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ROOT-KNOT NEMATODE RESISTANT BELL PEPPERS: AN ALTERNATIVE TO METHYL BROMIDE

Judy A. Thies¹, Richard L. Fery¹, and John D. Mueller². ¹U.S. Vegetable Laboratory, ARS, USDA. Charleston, SC, USA, 29414.

²Edisto Research and Education Center, Clemson University, Blackville, SC, USA, 29817. e-mail: jthies@awod.com

Root-knot nematodes (*Meloidogyne* spp.) are a major constraint to global production of bell pepper (*Capsicum* spp.). The effects of these ubiquitous pests are becoming more important on pepper in the U.S. and worldwide due to reduced methyl bromide production with pending removal of this fumigant for pre-plant soil treatment in 2005. Host resistance would be the most economical, environmentally benign alternative to methyl bromide for controlling root-knot nematodes in pepper. The *N* gene controls resistance to *M. incognita*, *M. arenaria*, and *M. javanica* in the bell pepper cultivars Charleston Belle and Carolina Wonder. Although expression of the *N* gene is modified at high temperatures (28°C and 32°C), both 'Charleston Belle' and 'Carolina Wonder' exhibited moderate resistance compared to their respective susceptible recurrent parents 'Keystone Resistant Giant' and 'Yolo Wonder B'. Expression of the *N* gene in the heterozygous condition (F1 and F1 reciprocal hybrid populations) against *M. incognita* was similar to the resistant parent at 24°C, 28°C, and 32°C. This demonstrates that only one of the parental inbred lines needs to be converted to the *NN* genotype to produce F1 hybrid cultivars with fully functional *N*-type resistance. The resistant parental inbred can be used to equal advantage as either the paternal or the maternal parent. In field tests at Charleston and Blackville, SC, the resistant cultivars Charleston Belle and Carolina Wonder were highly resistant; root galling was minimal for both cultivars. The susceptible cultivars Keystone Resistant Giant and Yolo Wonder B were highly susceptible; root galling was severe at both test sites. The resistant cultivars supported 93% fewer *M. incognita* eggs per gram fresh root than the susceptible cultivars. Root-knot nematode resistant bell peppers should provide economical and environmentally compatible alternatives to methyl bromide and other nematicides for managing root-knot nematodes.