

Insecticidal activities of natural sugar ester isolates of *Nicotiana* spp. and synthetic sugar esters were tested against *Bemisia argentifolii* Bellows and Perring in laboratory bioassays and a tomato field trial on staked tomato. A mixture of the pyrethroid cyfluthrin and methamidophos, as well as the juvenile analog pyriproxyfen, were used for comparison in the field trial. Mortality of adults immobilized on yellow sticky cards and sprayed to run-off ($\approx 100\%$ coverage) with sugar ester isolates of *Nicotiana* spp. (including *N. gossei*) approached 100%. In contrast, mortality of immobilized adults treated in a Potter spray tower ($\approx 70\%$ coverage) with the same concentrations of *N. gossei* was $<50\%$. Sugar ester isolates of *N. gossei*, *N. amplexicaulis*, *N. glutinosa*, *N. langsdorffii*, *N. trigonophylla*, and *N. palmeri* and a synthetic sucrose ester were more toxic to 2nd-instar nymphs at a rate of 1 g (AI)/liter than were isolates of *N. cavicola*, *N. simulans*, *N. pauciflora*, *N. plumbaginifolia*, *N. noctiflora*, and *N. otophora*. Whitefly populations on tomato sprayed weekly in the field with a sugar ester isolate of *N. trigonophylla* or 4 synthetic preparations were reduced by 40-98% for immatures and 43-73% for adults compared with untreated plants. Sugar ester isolate and synthetic sugar esters in the field tomato trials compared favorably with commercial insecticides for whitefly control.