SHORT COMMUNICATION

Is Horsenettle, Solanum carolinense L. (Solanaceae), an Alternate Host for Soybean Aphid, Aphis glycines Matsumura (Hemiptera: Aphididae)?

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Since its recent introduction to the United States in 2000, the soybean aphid, Aphis glycines Matsumura, (Hemiptera: Aphididae) has expanded its geographic range throughout most of the soybean growing regions in the United States. In Missouri, the geographic range of the aphid has expanded from 19 counties being infested in 2000 to more than 70 counties in 2004. In its native range of Asia and its latest expansion into North America, soybean aphid is heteroecious and considered to have a narrow host range. Multiple authors (Takahashi et al., 1993; Blackman and Eastop, 2000; Voegtlin et al., 2004) have reported several Rhamnus spp. (Rhamnaceae) as being the primary (overwintering) host(s) of this insect. In North America, it is well documented that the secondary (summer) host is cultivated soybean, Glycine max L. (Fabaceae) (Ragsdale et al., 2004). In addition to soybean, Venette and Ragsdale (2004) state that secondary hosts are restricted to species within Fabaceae as several works (Blackman and Eastop, 2000; Alleman et al., 2002) show that soybean aphid is capable of feeding and reproduction on several fabaceous species albeit with a range of poor to good success. Other works have examined the potential for soybean aphid biology to be supported upon secondary host species in plant families beyond Fabaceae such as the Solanaceae. However, experimental evidence has indicated that species such as tobacco, Nicotiana tabacum L., and potato, Solanum tuberosum L. (Solanaceae), are not likely to support soybean aphid biology (Fang et al., 1985; Ragsdale and McCormack, 2002; Venette and Ragsdale, 2004).

Horsenettle, Solanum carolinense L., is a native perennial solanaceous weed that is commonly found throughout the north-central United States in fields, gardens, and waste areas (Wax et al., 1981). It is considered a noxious weed in many states and key pest for many field cropping systems including soybean and crops commonly rotated with soybean such as corn, Zea mays L. (Poaceae) (Medlin et al., 2001; Whaley and Vangessel, 2002). While there are several examples of many insect species colonizing horsenettle (Judd et al., 1991; Nichols et al., 1992; Mena-Covarrubias et al., 1996; Nault et al., 1997), the potato aphid, Macrosiphum euphorbiae (Thomas) is the only aphid reported to colonize horsenettle (Leonard, 1963).

In this paper, we present our field observations indicating that soybean aphid utilizes and reproduces on horsenettle. This is the first report of soybean aphid utilizing a secondary host species beyond Fabaceae.

Materials and Methods

On 18 August 2004, one mile west of Concordia, Missouri (Lafayette, Co.) in a study examining parasites associated with various lacebug bug species (Heteroptera: Tingidae) infesting horsenettle, one of us (B.P) observed what appeared to be soybean aphid infesting the S. carolinense leaves. Approximately 200 S. carolinense leaves were excised, placed into plastic 76 liter bags and brought back to the laboratory for additional examination. Upon arrival in the laboratory, leaf samples were then examined for the presence and quantity of soybean aphid by visualization under a microscope (MsZ, Wild Co, Heerbrugg, Switzerland). The identity of all collected soybean aphids was determined using the methods of Voegtlin et al. (2004) by direct comparison to specimens previously identified by D. J. Voegtlin and by transfer of nymph and adult aperous viviparous females from horsenettle to excised soybean leaves (variety DKB38-52, Monsanto Inc., St. Louis, MO). The aphid infested soybean leaves were then placed upon water saturated filter paper and enclosed within a covered 100 x 15 mm plastic Petri dish held at 23 ± 1℃. Aphids that molted to larger instars and/or produced offspring that subsequently developed on the excised soybean leaves were considered a confirmation to our initial soybean aphid determination. Sampling of horsenettle at the Lafayette Co. site was continued using the previously described methods on 7 to 11 d intervals between 18 August and 27 October 2004. We also conducted single date samplings of horsenettle leaves for soybean aphid at selected locations using the above mentioned procedures.

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