

N O T E

Aggregation and Foraging Behavior of Imported Cabbageworm (Lepidoptera: Pieridae) Adults on Blue Vervain Flowers¹

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The imported cabbageworm [*Pieris rapae* (L.) (Lepidoptera: Pieridae)], also known as the cabbage white butterfly, is an important specialized pest on cruciferous plants (Brassicales: Brassicaceae) worldwide. In 2006 and 2014, aggregations of cabbage white butterflies were observed on a patch of flowering blue vervain [*Verbena hastata* (L.) (Lamiales: Verbenaceae)] plants on Zion Hope Road, near the Bellflower Research Farm in Tift Co., GA. Blue vervain is a native wildflower commonly found along the roadside throughout the United States and blooms in mid- to late summer (Kirk and Belt 2010, Plant fact sheet for blue vervain (*Verbena hastata*). USDA-Natural Resources Conservation Service, Norman A. Berg National Plant Materials Center, Beltsville, MD, 2 pp.). Blue vervain is not a known host plant for the cabbage white butterfly.

Because blue vervain is a native plant species, and cabbage white butterfly is an invasive pest species, the unique attractiveness between this invasive lepidopteran pest and the nonhost native plant has potential broad ramification for insect pest management. This phenomenon could be exploited and utilized in effective management tactic for invasive pests that use native plants or other natural resources. If the key visual and chemical attracting factors (e.g., color and shape of flowers, volatiles, or nectar) that attract the butterflies are identified and deployed to trap and kill the butterflies, the future populations of the cabbageworm infestation on *Brassica* vegetable crops could be significantly reduced in a given growing cycle of the cruciferous vegetable crop production.

The map coordinates for the location where the aggregation has been observed are N 31°30.063', W 83°33.596'. When aggregation occurred, foraging behavior of butterflies was also observed on blue vervain flowers in late mornings (around

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11:30 a.m.). It was not surprising that neither mating nor oviposition behavior was observed on blue vervain plants, which is from Verbanaceae, not a host plant from Brassicaceae.

Male and female butterflies can be separated by the dorsal view of the front wings, that is, males have one black spot in the middle of the front wings, whereas females have two black spots in the middle of the front wings (Obara and Hidaka 1968, Proc. Japan Acad. 44:829–832). The sex ratio of male to female butterflies on blue vervain flowers was determined as 1:3, based on a total of 28 butterflies captured using standard sweep net sampling method on 20 July 2006. The number of the butterflies (males and females) collected per five sweeps from three samples were 7 (3 and 4), 9 (2 and 7), and 12 (2 and 10) butterflies, respectively. During the week of 30 June 2014, a similar but much less impressive butterfly aggregation was observed at the same location. The number of butterflies observed in 2014 was approximately 10–20% of what had been observed in 2006. The aggregation site observed in 2014 was on blue vervain plants at the edge of a *Brassica* vegetable field, whereas the nearest *Brassica* field in 2006 was approximately 1.6 km northeast of the aggregation site. In addition, the density of blue vervain plants was much higher at the edge of a peanut (*Arachis hypogaea* L. [Fabales: Fabaceae]) field in 2006 than that at the edge of the *Brassica* vegetable field in 2014.

The observation of the female-biased attraction of the cabbage white butterflies by blue vervain flowers could potentially be utilized to target females, and, in turn, significantly reduce future populations of the cabbageworm infestation on *Brassica* vegetable crops.

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