

**EXPANSION OF THE GLASSY-WINGED SHARPSHOOTER IN
NORTH CAROLINA VINEYARDS AND ITS ASSOCIATION WITH THE MIMOSA TREE**

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ABSTRACT

The glassy-winged sharpshooter (GWSS; *Homalodisca vitripennis*) was found in several North Carolina counties that were not previously reported between 2006 and 2009. Data from this four-year study showed that GWSS has been expanding to new sites; this movement appeared to start in the south coastal region and move to the northern and western parts of the state. Several GWSS specimens were found in Currituck Co. (in the most northeastern part of the state) in 2006 and none was found in Wake Co. (Piedmont) the same year in a vineyard that was heavily monitored since 2004, but GWSS appeared in this vineyard in 2007 and 2008. In addition, we found that GWSS preferred the mimosa tree, *Albizia julibrissin*. In areas close to creeks, large numbers of adults and nymphs were recorded in these plants. In the laboratory, this insect laid eggs and completed its life cycle feeding only on this plant. Currently, GWSS appears to have established populations in most of the Coastal Plain and in several areas of the Piedmont. However, GWSS was not detected in the Yadkin Valley (major vinifera growing region of NC) in the northwestern Piedmont, or the Mountain region of NC in 2009.

LAYPERSON SUMMARY

Data collected in this study showed that the glassy-winged sharpshooter (GWSS) has expanded its range to new sites in North Carolina. This movement appeared to start in the southern coastal region and move to the northern and western parts of the state. The GWSS was found in Currituck Co. (northeastern part of the state) but none was found in Wake Co. (Piedmont) in 2006 in a vineyard that was heavily monitored since 2004, but GWSS appeared in this vineyard in 2007 and 2008. In addition, we found that GWSS preferred the mimosa tree, as large numbers of adults and nymphs were recorded in these plants close to creeks. In the laboratory, this insect laid eggs and completed its life cycle feeding only in this plant. Currently, GWSS appears to be established in most of the Coastal Plain, and several areas of the Piedmont. However, GWSS was not been detected in the Yadkin Valley in the northwestern Piedmont (major vinifera growing region of NC) or the Mountain region of NC in 2009.

INTRODUCTION

Leafhoppers are vectors of *Xylella fastidiosa* (*Xf*), the causal agent of Pierce's disease (PD) in European grapes (*Vitis vinifera*). The glassy-winged sharpshooter (GWSS) has become a well known subject of study since its introduction to California. There, the grape growers faced a dire situation after the arrival of GWSS - vines infected with *Xf* increased and the disease became widespread. Reports comparing the transmission of *Xf* by GWSS with native Californian species such as *Graphocephala atropunctata* showed a lower transmission capacity of the former (Hill and Purcell 1995); however, its dispersion capacity (ability to fly long distances) facilitated the expansion of the disease.

In *vinifera* growing areas of NC, four species of sharpshooters were reported prior to the beginning of this study (Villanueva et al. 2007). The presence of the GWSS may increase the incidence of PD, and further limit development of the vinifera industry in North Carolina. In a preliminary study, we observed that the mimosa tree (*Albizia julibrissin*) was apparently a good host of GWSS and leafhoppers were monitored with yellow sticky traps placed in several vineyards of NC and in areas where mimosa trees grows.

OBJECTIVES

1. To evaluate the distribution of GWSS in North Carolina.
2. To study the importance of *Albizia julibrissin* as preferred host of GWSS.

RESULTS AND DISCUSSION

GWSS was first reported in NC in Pender Co. in 2002 (David Stephan, personal communication) prior to this study (**Figure 1**). Pender Co. is located in the southeastern Coastal Plain. In 2006, GWSS was found on yellow sticky traps collected from Currituck Co. (the most northeastern county of NC), which indicates that GWSS has moved to the north. Myers et al (2007) using yellow sticky traps, did not collect any GWSS in two Piedmont vineyards, one located in Wake Co. and the second in Alamance Co. in 2004 and 2005 (**Figure 1**). However, in this study we sampled intensively (>12 traps/vineyard) the same vineyards from 2006 to 2009 and GWSS was found in large numbers in 2007 and 2008 in the Wake Co. vineyard and in addition, live specimens were collected in the NC State University campus in 2009 (in the same county). Also, one GWSS was found in Alamance Co. in August 2009 (**Figure 1**). These results indicate that GWSS has moved from the eastern NC to the west over the past three years. GWSS could have been present in the Coastal Plain counties before this study started in 2006. This area is where muscadine grapes are grown and large numbers of GWSS were detected in traps near muscadine vineyards from mid-June to October in 2007 and 2008. Additionally, they were more abundant in muscadine vineyards than *Oncometopia orbona* the most well distributed sharpshooter in NC. The cause of this migration may be the warmer temperatures which have been observed in recent years (Anas et al. 2008).

We also sampled areas where *Albizia julibrissin* grows; these sites were near vineyards or beside roads and creeks. In most cases we captured GWSS, especially in areas close to creeks. More GWSS were captured in traps hung close to young *A. julibrissin* than plants of *Lonicera albiflora* (honeysuckle), a *Rhus* sp. (sumac) and *Rubus* sp. (blackberry) growing nearby, cherry (*Prunus* sp.), wild grape (*Vitis* sp.) or an old *A. julibrissin* tree (20 ft tall) (**Figure 2a**). The young *A. julibrissin* plants were cut every year from the base and trunks by highway maintenance crews and can grow 2.5 to 3.5 m from April to September. Also, by mid-June large numbers of *O. orbona* were caught in traps in old *A. julibrissin* (~20 ft height) plants. The reason for this is unknown but this plant may be important not only as preferred host of GWSS but it may be a temporary host of *O. orbona* during this time of the year. However, in live counts, GWSS was generally found in greater numbers compared with other species in *A. julibrissin* plants (**Figure 3**). In addition, GWSS females -placed in cages containing six-eight month old *A. julibrissin* plants- were able to laid eggs, and complete their development on these plants alone.

CONCLUSION

In this study we found that GWSS has expanded to new areas of North Carolina. This insect might have been undetected along the coast and southern part of the state for many years. However, in spite of intensive monitoring, it was not detected in the central part of the state until 2007 when we captured it in a vineyard in Wake Co. and 2009 in Alamance Co. Many species of leafhoppers that are vectors of *Xf* are endemic to NC, but GWSS may cause *Xf* to spread more rapidly. Additionally, we found that the mimosa tree is a preferred host of GWSS. GWSS was able to lay eggs, and completed its life cycle on this plant. Also, direct visual counts and trap catches showed a preference for it compared to the surrounding vegetation. Additionally, large numbers of *O. orbona* were found in old *A. julibrissin* trees.

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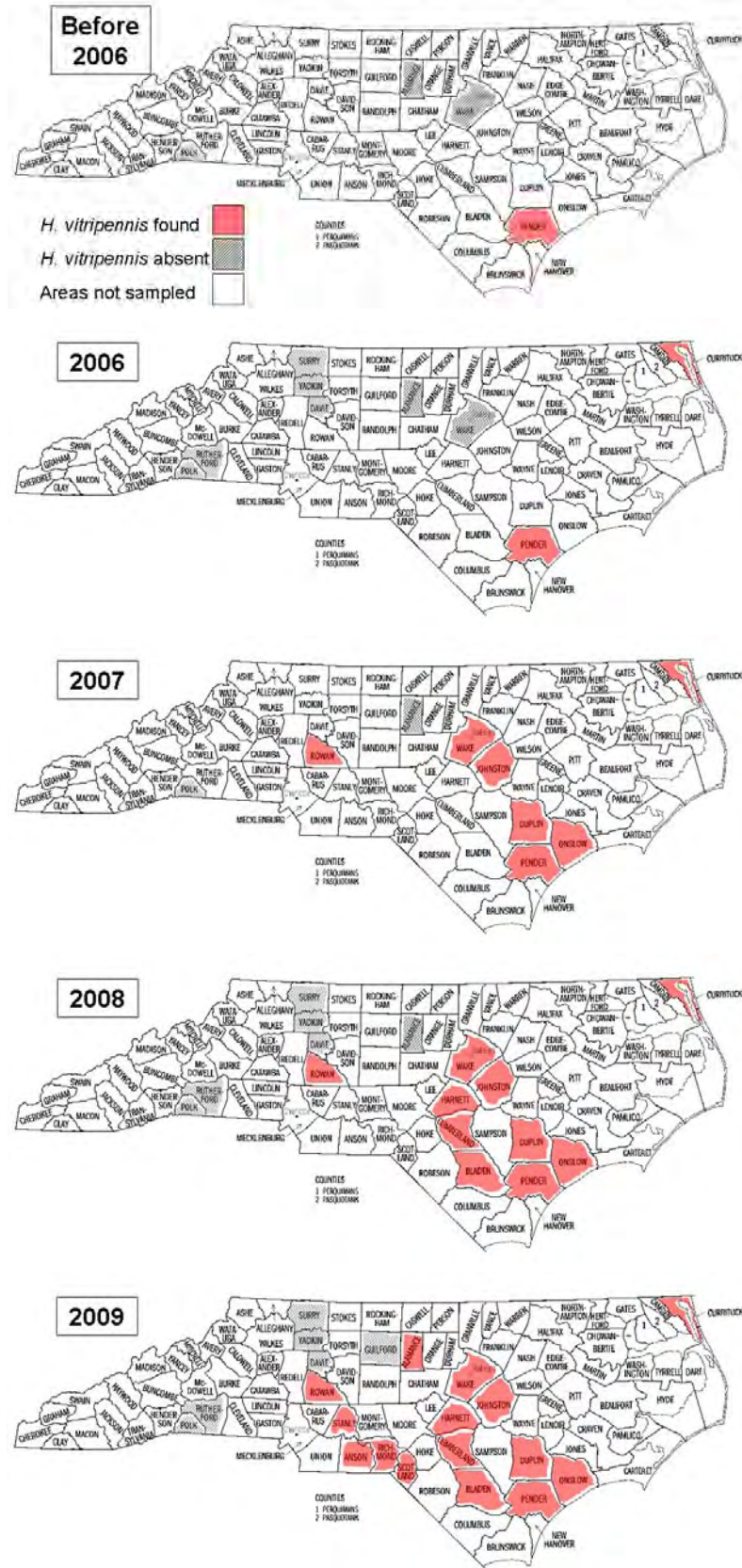


Figure 1. North Carolina maps showing counties where GWSS were present, absent, and not sampled.

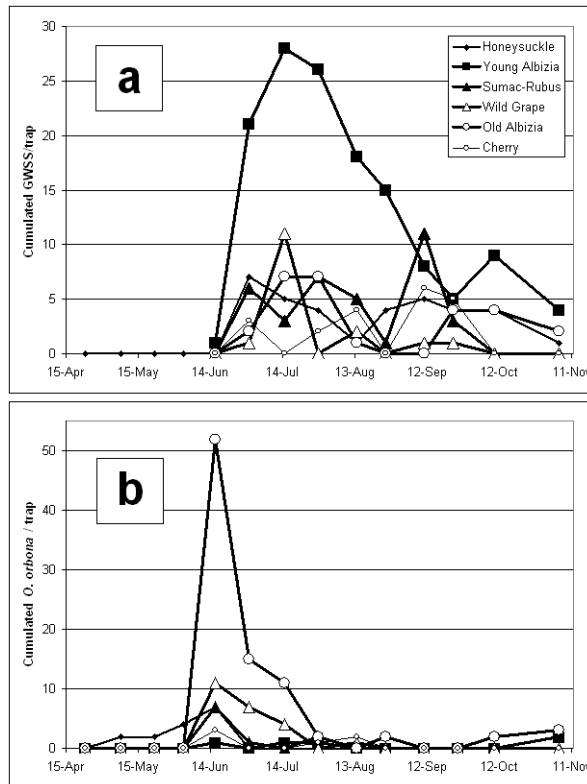


Figure 2. Cumulated numbers of (a) *GWSS* (*GWSS*) and (b) *Oncometopia orbona* caught in yellow sticky traps placed in honeysuckle, sumac- Rubus, wild grape, cherry, and old and young *A. julibrissin* trees in 2008. Traps were replaced every 2 weeks.

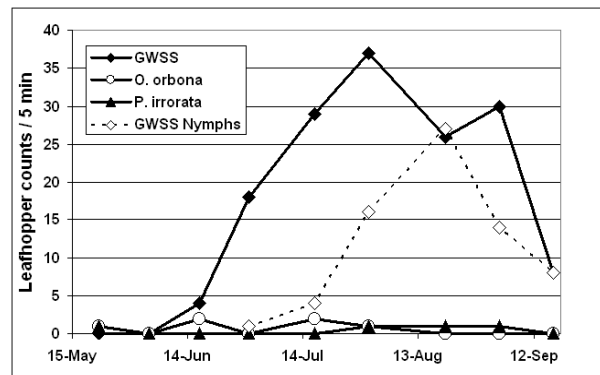


Figure 3. Numbers of *GWSS* (*GWSS* adult or nymphs), *Oncometopia orbona*, and *Paraulacizes irrorata* found during 5-min interval counts in *Albizia julibrissin* plants in 2007

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Section 2:
Vector
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