DEVELOPMENT OF TRAPPING SYSTEMS TO TRAP GLASSY-WINGED SHARPSHOOTER *(HOMALODISCA COAGULATA)* ADULTS AND NYMPHS IN GRAPE

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INTRODUCTION

The glassy-winged sharpshooter (GWSS) *Homalodisca coagulata* is native to the southeastern United States (Young 1958) where it is a known vector of various strains of the bacterium *Xylella fastidiosa*. Since its introduction into California, it has become established in large numbers in certain areas. PD has been a problem in California for more than 100 years, but the GWSS is a more effective vector of *X. fastidiosa* because it can feed on the xylem of seemingly dormant woody stems. Unlike sharpshooters native to California, GWSS can reproduce in grape.

One of the crucial components and cornerstones of integrated pest management is the monitoring for the presence and density of a pest. Proper detection methods allow for optimum integration of biological, cultural, physical, chemical and regulatory measures to manage a pest. Yellow sticky traps have been used extensively in the southeastern U.S. for monitoring leafhoppers including GWSS in peach (Ball 1979) and citrus (Timmer et al. 1982). However, the reliability of these methods to detect the GWSS in California is questionable, and traps specifically designed for GWSS do not currently exist. To compound the situation, current methods are not standardized. For example, different sizes and shades of yellow sticky traps are being used in monitoring programs. The AM designation on certain traps actually refers to the apple maggot for which the trap was designed. Furthermore, the relationship of trap catches to actual populations of GWSS in grape or citrus are currently unknown.

Trap designs based on the behavior and biology of the insect in question have a much higher chance of success than relying on trial and error of traps designed to monitor other insects. Female GWSS secrete and deposit brochosomes on the forewings just prior to egg laying (Hix 2001a). These spots are then scraped off during egg lying. Furthermore, white spots are secreted before each egg mass is laid, and female GWSS can only produce rod shaped brochosomes after mating. It is therefore feasible to relate preovipositional females with white spots and residues to egg masses in associated vegetation analysis. The white spots are very visible on females caught in traps (Hix 2001a). Many leafhopper species produce brochosomes, but only females are known to produce the rod shaped brochosomes (Rakitov 2000). As reported here in 2001, data from the intercept traps and colored plates clearly indicated that GWSS are attracted to yellow as well as orange. Attraction to these colors was statistically significant (Hix 2001b) and demonstrated that even though the AM type trap may have reliability issues, it is clearly not a "blunder trap."

OBJECTIVES

This research addresses: 1) which hue of yellow is the most attractive to GWSS; 2) what is the field longevity of a trap before weather and photo degradation impact trap reliability; 3) how does trap catch relate to populations of GWSS in citrus and grape; 4) GWSS spectral sensitivity; 5) how does temperature affect trap catch; 6) the feasibility of using certain wavelengths of light to enhance trap catch of GWSS in vineyards and associated orchards; 7) develop and evaluate sticky barriers to trap and detect GWSS nymphs within a vine or tree canopy.

RESULTS AND CONCLUSIONS

Traps were deployed in wine grape vineyards in Temecula with known high populations in addition to vineyards with lower populations. These vineyards were either under organic farming practices or were minimally farmed. Trap types tested included plates, commercially available yellow sticky cards (6), and nymph traps (3 colors). Traps were checked weekly and visual count of egg masses, nymphs, and adults were made. GWSS were sexed, and females with forewing spots of brochosomes or residue were noted.

The data indicated relationships between the number of females trapped and oviposition in associated vegetation. The number of females trapped in July August and September 2002 showed a strong relationship to the number of nymphs found in searches. A search consisted of 3 sets of 25 vines near a designated trap. Analysis of the data from the vineyards provided the expression $y = 3.4X - 2.4$ where y = number of nymphs per search and X is the number of females captured per trap (R^2 = 0.97, F = 378.7, P =0.003). This expression is only valid in situations where vineyards have not been treated for GWSS.

Yellow plates caught statistically more GWSS than commercially available sticky traps while orange traps usually caught more than the commercial traps. The nymph traps caught first to fifth instar nymphs in moderate populations. These traps

are easy to deploy in grape canes in situations where it could take hours of searching to locate nymphs. Low populations of GWSS nymphs in a vineyard may pose threats of moving *X. fastidiosa* from vine to vine within trellises. Two of the vineyards studied had high populations of GWSS nymphs. GWSS phenology in wine grapes was determined (Figure 1). Moderate GWSS populations can clearly establish and reproduce in vineyards when it is not managed even if nearby GWSS populations are low.

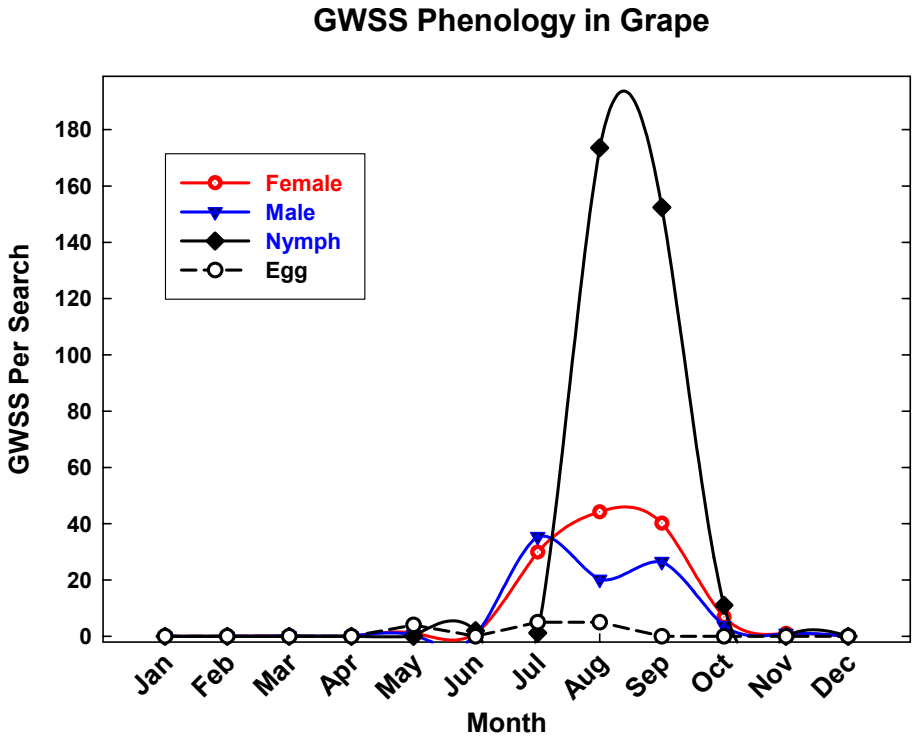

Figure 1. Glassy-winged sharpshooter phenology in wine grapes as determined from vine searches in 5 commercial vineyards in Temecula during the 2001-02 seasons. A search consisted of thorough examination of 3 sets of 25 vines.

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