INTERIM PROGRESS REPORT FOR CDFA AGREEMENT Number 11-0147-SA

PROJECT TITLE

VOUCHERING SPECIMENS OF EGG PARASITOIDS OF THE GLASSY-WINGED SHARPSHOOTER COLLECTED BY THE CDFA PIERCE'S DISEASE BIOLOGICAL CONTROL PROGRAM IN CALIFORNIA AND TEXAS A&M IN TEXAS

PRINCIPAL INVESTIGATORS AND COOPERATORS

Principal Investigator:
Serguei V. Triapitsyn
Department of Entomology
University of California
Riverside, CA, 92521, USA
E-mail: serguei.triapitsyn@ucr.edu

Cooperators:
David J. W. Morgan, Jessica Nichols
Integrated Pest Control Branch –
Biological Control Program
California Department of Food and Agriculture
Mt. Rubidoux Field Station
4500 Glenwood Drive, Riverside, CA, 92501, USA
E-mail: dmorgan@cdfa.ca.gov

Forrest L. Mitchell, Aaron Hassell
Texas AgriLife Research and
Extension Center at Stephenville
1229 North US Highway 281
Stephenville, Texas, 76401, USA
E-mail: FMitchel@ag.tamu.edu
E-mail: ahassell@ag.tamu.edu

Reporting Period: The results reported here are from work conducted from 1 March 2012 to 25 July 2012.

SUMMARY OF MAJOR RESEARCH ACCOMPLISHMENTS AND RESULTS FOR EACH OBJECTIVE

(Objective 1) Check the taxonomic identities of all the specimens of GWSS egg parasitoids from California; pull out specimens of taxonomic and voucher interest.

Work done since the last Progress report: 10 specimens of each species were pulled out by the Jessica Nichols (CDFA) from the collections in California; these were dried out from ethanol and then mounted on both points and slides by Vladimir Berezovskiy and identified by the PI.

Work on this Objective has been completed.

(Objective 2) Transfer of the bulk of the voucher specimens from Texas into leak-proof vials for long-term storage; label properly (using archival, acid-free paper) and database all the vials using barcodes with unique numbers. Fully identify and catalog approximately 7,000 GWSS parasitoids collected by Texas A&M in the native range of GWSS.

All 930 vials with GWSS egg parasitoids received from Texas AgriLife Research and Extension Center at Stephenville were completely curated by the two technicians employed by the project: these were transferred from the original poor vials into leak-proof vials for long-term storage; labeled properly (with the data label inside and the identification label and the database number and a bar code outside of each vial), and databased using barcodes with unique UCRC ENT numbers, and arranged into boxes for storage (Figs 1, 2). At the end of this project, these will be turned over to Dr. David Morgan (Integrated Pest Control Branch, Biological Control Program, California Department of Food and Agriculture), for the eventual deposition in the California State Collection of Arthropods in Sacramento.

Work on this Objective has been completed.

(Objective 3) Prepare valuable representatives of each species that will be dried from ethanol using a critical point dryer, point-mounted as museum quality vouchers, labeled, and databased.

That, along with Objective 2, was the major focus of our work during the report period. Representatives of each species (at least 50 specimens of the common species from Texas, and as many as possible for less common species, and all specimens of the rare species) were critically pointed from ethanol, and point-mounted. Then representatives of both sexes of each species (both sexes) were selected and slide-mounted in Canada balsam. Work is under way to label and database all the mounted specimens (both on

points and slides) from both California and Texas. Additional specimens of the species, as needed, will be point- and slide-mounted later, after the bulk of the already mounted ones is labeled and databased.

Work on this Objective is expected to be completed by the end of November 2012.

PUBLICATIONS OR REPORTS RESULTING FROM THE PROJECT

Triapitsyn, S.V. 2011. Vouchering specimens of egg parasitoids of the glassy-winged sharpshooter collected by the CDFA Pierce's Disease Biological Control Program in California and Texas A&M in Texas 2011. In: *Proceedings of the 2011 Pierce's Disease Research Symposium, December 13–15, 2011, Sheraton Grand Sacramento Hotel, Sacramento, California, organized by California Department of Food and Agriculture* (Esser, T., Chief Ed., West, D., Associate Ed.). Time Printing, Inc., Sacramento, California, pp. 17-18. Available online at http://www.cdfa.ca.gov/pdcp/Research_Symposium_Index.html.

PRESENTATION ON RESEARCH

The PI made a presentation, as a speaker, at the 2011 Pierce's Disease Research Symposium, December 13–15, 2011, Sheraton Grand Sacramento Hotel, Sacramento, California, organized by California Department of Food and Agriculture, entitled: "Egg parasitoids of sharpshooters in the New World".

RESEARCH RELEVANCE STATEMENT

Recently (since 1997), major efforts have been undertaken by the CDFA GWSS Biological Control Program to survey for egg parasitoids of GWSS in California and to release several egg parasitoid species (*Anagrus epos* Girault, *Gonatocerus* spp.) from other states in the USA and also northeastern Mexico as part of the classical biological control effort (CDFA 2011).

It is well known that the taxonomic impediment in identification of natural enemies may adversely affect the biological control efforts against agricultural pests. In the case of the GWSS, early misidentifications (due to objective reasons, such as partially inaccurate existing keys) of one of the species of the California native egg parasitoids of GWSS (as *Gonatocerus morrilli* (Howard)) resulted in the inability of biological control practitioners to distinguish them from the introduced "real" *G. morrilli* from Texas and northwestern Mexico. Therefore, contamination of the colonies in the mass-rearing program was noticed only after the molecular methods distinguished them as two genetically different entities. The "California *G. morrilli*" was later described taxonomically as a new species, *Gonatocerus walkerjonesi* Triapitsyn, based on the combination of molecular evidence and some morphological differences that are difficult to observe without special preparation of the specimens. Another native species, *Gonatocerus morgani* Triapitsyn, was also described from Orange Co., CA; it is now being mass-produced and released in other parts of California infested with GWSS. As proper part of the ongoing biological control program against GWSS, the CDFA GWSS Biological Control Program has conducted extensive pre- and post-surveys of the egg parasitoids of GWSS in California from 2001. These surveys, which also included egg parasitoids of the native sharpshooter in California, the smoke-tree sharpshooter *Homalodisca liturata* Ball, have resulted in collection of about 10,000 specimens of egg parasitoids (Mymaridae and Trichogrammatidae) which are stored, along with voucher specimens of the numerous colonies of GWSS egg parasitoids maintained by the CDFA, in more than 7,500 vials at the CDFA Mt. Rubidoux Field Station in Riverside, CA. Also, Dr. Forrest L. Mitchell has kindly donated to the CDFA GWSS Biological Control Program 930 vials of GWSS parasitoids collected in Fredricksberg Co., TX, by Texas A&M staff. These insects were collected during 2005-2007, each vial containing parasitoids that have emerged from a single egg mass (ca. 8 individuals per vial, but often many more). We are curating these collections to preserve the invaluable voucher specimens for further analyses (including molecular, distributional, taxonomic, biological, etc.), thus making them available. The specimens and information on them will be useful for the California Department of Agriculture GWSS/PD Biological Control Program and biological control research practitioners in this state and beyond.

LAY SUMMARY OF CURRENT YEAR'S RESULTS

Important, irreplaceable, and numerous voucher specimens of the GWSS egg parasitoids from California and Texas were identified to species (several representatives of the families Mymaridae and Trichogrammatidae) and are being curated in the course of this two-year project. Museum-quality specimens have been preserved and prepared. Its main objectives are to label (using archival paper and unique plastic database numbers), identify, database (including georeferencing), preserve, and partially dry from ethanol and point-mount specimens among at least 17,000 voucher specimens of mymarid and trichogrammatid egg parasitoids of GWSS. These were either collected (reared) by the CDFA GWSS Biological Control Program personnel in California since 2001 in the course of pre- and post-release surveys, are irreplaceable vouchers of the colonies of the biological control agents that were released in California (both exotic and native), or were collected by staff of Texas A&M in Texas since 2005. Taxonomic identifications were checked and, when necessary, specimens were identified by the PI for the California material (more than 7,500 vials). Specimens from Texas (in 930 vials) were all identified to species and were transferred into leak-proof vials with good stoppers to prevent alcohol leakage, labeled properly using acid-free archival paper, and databased using UC Riverside Entomology Research Museum numbering system which then can be made available online if desired. Valuable representatives of each species were dried from ethanol using a critical point dryer and point-mounted (and representatives of both sexes slide-mounted) as museum quality vouchers, and also are beeing labeled and databased. Most voucher specimens from Texas will be submitted to the CDFA Mt. Rubidoux Field Station in Riverside

to be eventually transferred for storage the California State Collection of Arthropods (CDFA) in Sacramento, its permanent depository; some duplicate representatives and a few taxonomically important specimens will be also deposited in the UC Riverside Entomology Research Museum.

STATUS OF FUNDS.

As of July 2012, a little more than $3,300 remained available, which will be used to accomplish Objective 3 in full, and to present the results at the 2012 Research Symposium. A no-cost extension has been granted until 6/30/2013.

SUMMARY AND STATUS OF INTELLECTUAL PROPERTY PRODUCED DURING THIS RESEARCH PROJECT.

Not applicable.

ILLUSTRATIONS:

Fig. 1. A box with curated, labeled, and databased vials with identified GWSS egg parasitoids from Texas.

Fig. 2. A typical curated vial containing *Gonatocerus ashmeadi* egg parasitoids from Texas.