A MAJOR PEST OF COTTON, *OXYCARENUS HYALINIPENNIS* (HETEROPTERA: OXYCARENIDAE) IN THE BAHAMAS

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Oxycarenus hyalinipennis (Fig. 1) is a member of the superfamily Lygaeoidea, family Oxycarenidae (Henry 1997), subfamily Oxycareninae. Originally named *Aphanus tardus* var. *hyalinipennis*, this species was described from Italy by Costa in 1847. Adults measure 4 to 4.3 mm long and are tapered anteriorly and rounded posteriorly; their thorax, head, antennae, and femora are black and their wings are translucent white, but this species is highly variable (Slater 1972). Males and females have similar coloration, but males are slightly smaller than females. There are 5 instars (Fig. 1), which have pink to red abdomens.

Oxycarenus hyalinipennis has numerous synonyms and common names, but as an important pest of cotton worldwide, it is commonly referred to as "the cotton seed bug." It not only feeds on other plants in the order Malvales, especially in the family Malvaceae, but also in Tiliaceae and Sterculiaceae (Slater & Baranowski 1994). Adults and nymphs suck oil from mature seeds and fluid from leaves of young stems to obtain moisture, according to Ananthakrishnan et al. (1982). If cotton seed bugs are present in sufficient numbers, the cotton fiber becomes stained during processing by the maceration of their bodies. In Israel during outbreaks, this insect has been reported as aggregating on various trees and shrubs including dates, figs, avocados, and persimmons. Many of these fruits were damaged, purportedly due to contamination with a pungent odor (Nakache & Klein 1992).

Oxycarenus hyalinipennis has a worldwide distribution, although it has not been reported from North America. Because it has been intercepted numerous times at U.S. ports of entry and because it is already established on islands near the U.S. mainland, its arrival in the U.S. is expected. In the West Indies, Baranowski & Slater (2005) report it from the Turks and Caicos, Bahamas, Cayman Islands, and Hispaniola. It was not found during a preliminary survey along the entire eastern coast of Florida in 2006 (Brambila & Dobbs, unpublished data, 2007).

The objectives of this study were to (1) collect observational data on *O. hyalinipennis*, and (2) determine the infestation levels of this pest on cotton in Great Inagua.

Great Inagua was the site of a failed attempt to grow and cultivate cotton, *Gossypium hirsutum* L., in the early 20th century. These cotton plantations lasted only a few years, but the cotton itself has persisted in a feral state and can be found as a roadside weed near Matthewtown and former settlements (Fig. 2). This made Great Inagua an excellent location to look for and study infestation levels of *Oxycarenus hyalinipennis* (Costa), a known pest of cotton.

Three locations were chosen for survey along the western coast of Great Inagua (Fig. 2). Only

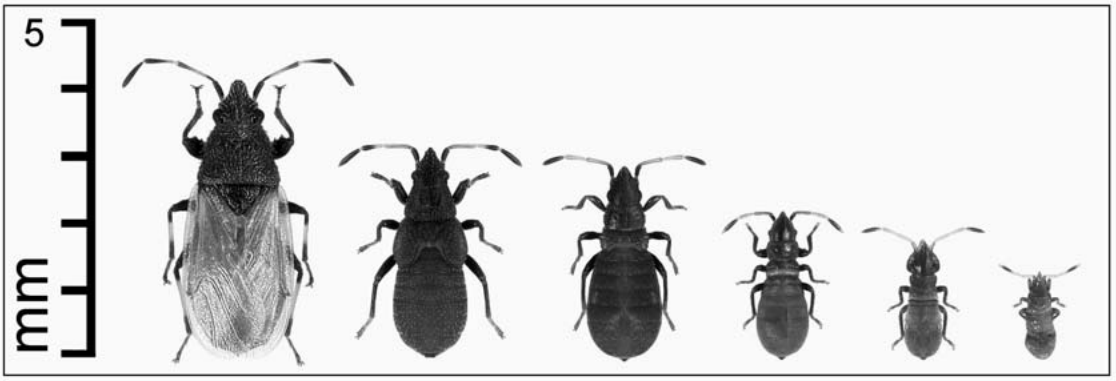

Fig. 1. Adult and 5 nymphal instars of *O. hyalinipennis*.

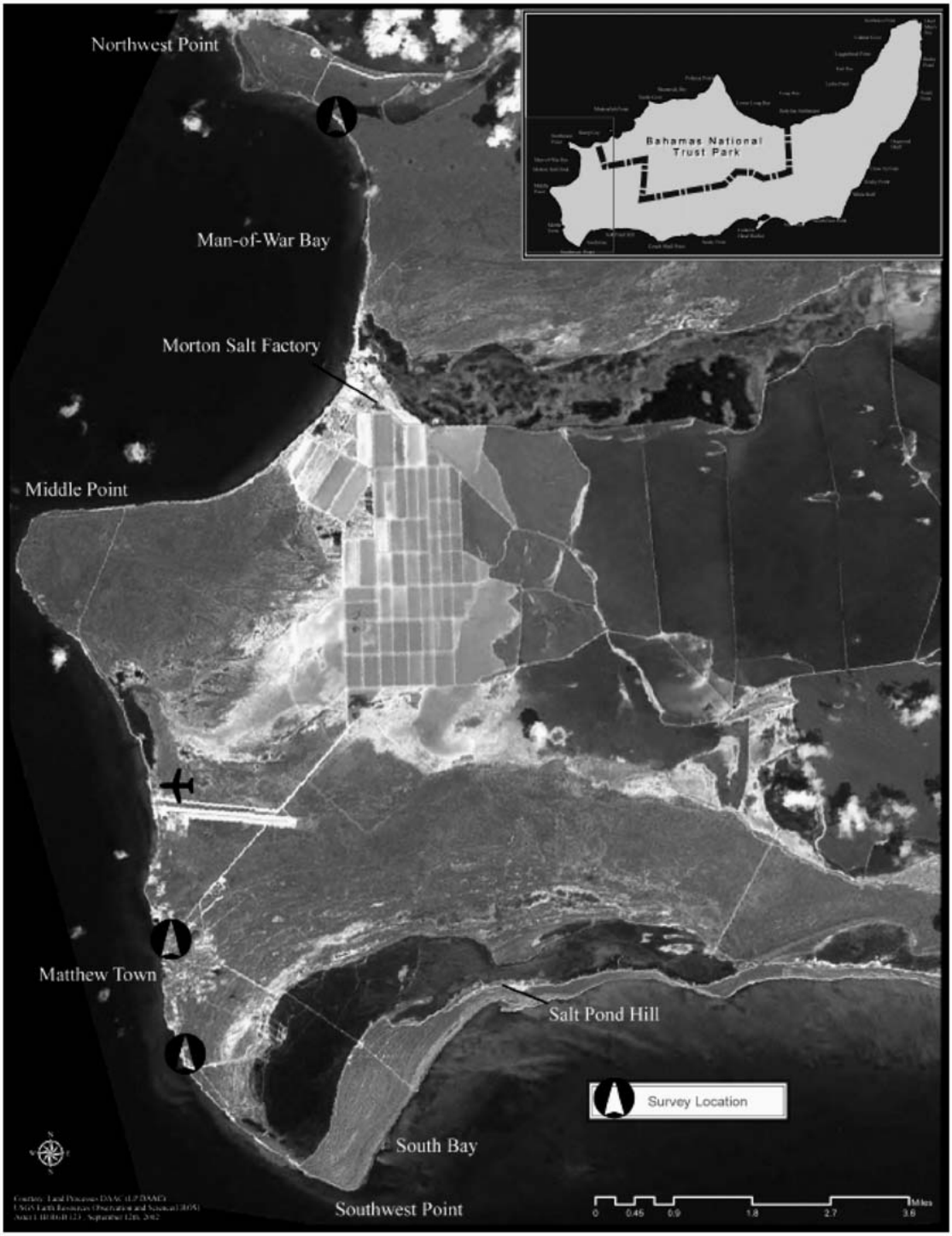

Fig. 2. Satellite photograph of the west end of Great Inagua showing survey sites for *O. hyalinipennis*.

easily accessible sites with dense populations of cotton were chosen for study. The majority of Great Inagua is made up of large saltwater ponds and very xeric palm forests. For the most part cotton could only be found near current or former settlements. Sites were spaced out as far as the

existing cotton population would allow. Site 1 was at the extreme north/northwestern limit of the feral cotton distribution on the island, Site 2 was in the middle of the distribution and Site 3 was at the extreme south/southeastern edge of the distribution. At each location, 20 cotton plants were randomly selected and 5 bolls from each plant were removed and placed into a plastic bag. Each boll was inspected for the presence of *O. hyalinipennis* and then beaten over a white laboratory tray. All insects were aspirated and placed in 70% isopropanol. The presence or absence of *O. hyalinipennis* in a boll was recorded for each boll. The percent infestation within the bolls on each plant at each of the 3 locations was then determined. This survey was carried out 10-15 Jul 2007.

The cotton surveyed at Site 1 (Fig. 2) on the northwest end of the island produced no *O. hyalinipennis*. This area was completely uninhabited and quite remote; about 16 km from Matthewtown. This part of the island contains an abandoned settlement, with large amount of cotton growing in the area. The northwest portion of the island was separated from other cotton aggregations by the enormous evaporation ponds surrounding the Morton salt factory. This salt water recovery area was extremely harsh with desolate salt beds stretching for many miles. If *O. hyalinipennis* arrived in Matthewtown recently it could be years before these insects are able to cross this barrier (Fig. 2).

Cotton from site 2 (Fig. 2), located in Matthewtown, was severely infested (96% of bolls) with *O. hyalinipennis*. Matthewtown is the only settlement on the island and therefore a likely site of introduction from imported plant material. Most plant material brought into the island comes from Nassau (New Providence), which has not had *O. hyalinipennis* recorded from the island. However, it is unknown whether this pest was introduced via plant material or flew from neighboring islands where the insect is known to exist.

Site 3 (Fig. 2) was located just east of Matthewtown. This area was uninhabited, but was much closer to the settlement. A contiguous line of plants and vegetation exists from Site 2 to Site 3 without major biological boundaries such as the aforementioned evaporation ponds. Cotton plants sampled in this area also were severely infested (91% of bolls).

The levels of infestation in the cotton at Sites 2 and 3 were so high that it made it very difficult to determine whether an alternate host existed. This pest could be found resting on many different plant species near cotton plants. Virtually all of the 1,000 *O. hyalinipennis* collected during this survey were found in the bolls of the cotton plants. They could be found on practically every boll of every cotton plant in the infested area and in some cases with over 30 bugs in a single boll. While some specimens were collected standing on the cotton fibers on the outside of the boll, the great majority were found deeper in the boll around the seeds and would emerge when the boll was agitated. Occasionally, these bugs could be found in the leaf litter beneath the cotton plant and even more rarely on the leaves.

This tendency to heavily infest either the cotton boll or the leaf litter beneath the plant is what makes effective application of pesticides for control of *O. hyalinipennis* so difficult. The insecticide will have very little effect within these protected environments. During seedbug outbreaks, effective control is achieved in other countries with a combination of chemicals that have both contact and systemic properties. These are usually recommended as ULV (ultra low volume) sprays applied aerially early in the morning while the insects are less active.

A pest reservoir of this magnitude, only 800 km (500 mi) from the coast of Florida should greatly concern anyone associated with invasive species research and/or cotton production. While this pest has not as yet been found in Florida, it has been steadily extending its range northward in the Caribbean. Continued vigilance by port inspectors and target-based surveys, such as those carried out by the Cooperative Agricultural Pest Survey (CAPS) program, are the keys to interception or early detection of this very damaging pest. This species of quarantine importance can be introduced into Florida inadvertently, or by natural means, and could easily become widespread in the state. It could pose a serious threat to agriculture, not only to cotton but okra as well. This insect is also a pest of hibiscus which could threaten some of Florida's largest plant nurseries.

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Summary

The cotton seed bug, *Oxycarenus hyalinipennis* (Costa), was found heavily infesting feral cotton in Matthewtown, Great Inagua, Bahamas. This pest was found in 2 out of the 3 sites and had severely infested the 40 plants surveyed at those 2 locations. Although collected in leaf litter and occasionally on the leaves of cotton plants, the vast majority of these bugs were found within the bolls. In some cases, as many as 30 individual bugs could be found in a single cotton boll. At Site 2, 96% of the cotton bolls were infested while 91% of

the cotton bolls were infested at Site 3. These observations indicate that *O. hyalinipennis* is a major economic threat to cotton in the United States.

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