

# Two-Spot Cotton Leafhopper *Amrasca biguttula* (Ishida) (Insecta: Hemiptera: Cicadellidae)<sup>1</sup>

Hugh A. Smith, Yisell Velazquez-Hernandez, and Alexandra M. Revynthi<sup>2</sup>

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

## Introduction

*Amrasca biguttula* (Ishida, 1913) (Hemiptera: Cicadellidae), also known as the two-spot cotton leafhopper, became established in Florida in 2024 where it causes significant damage to a range of ornamental and horticultural crops (Liburd et al. 2024). It is a major pest of okra (*Abelmoschus esculentum* L.), eggplant (*Solanum melongena* L.) and various types of hibiscus (*Hibiscus* spp. L.). It is also a major pest of cotton (*Gossypium hirsutum* L.) in Asia and poses a threat to cotton production in Florida and the southeast USA (Esquivel 2025). The pest poses a significant regulatory burden to the state in addition to damage presently inflicted on production of various horticultural crops, and the threat to cotton grown in the state's Panhandle.

## Synonymy (summarized from Xue et al. 2017)

*Chlorita biguttula* Ishida, 1913  
*Empoasca biguttula* Shiraki, 1913  
*Zygina punctata* Melichar, 1914  
*Empoasca bipunctata* Schumacher, 1915  
*Chlorita bimaculata* Matsumura, 1916  
*Empoasca devastans* Distant, 1918  
*Empoasca uniguttata* Jacobi, 1941  
*Empoasca quadrinotatissima* Dlabola, 1957  
*Empoasca biguttula* (Ishida)  
*Amrasca devastans* (Distant)  
*Sundapteryx biguttula biguttula* (Ishida)  
*Sundapteryx biguttula punctata* (Melichar)  
*Empoasca schumacheri* Metcalf, 1968  
*Amrasca biguttula* (Ishida)  
*Amrasca biguttula punctata* (Melichar)  
*Amrasca biguttula biguttula* (Ishida)

## Distribution of *Amrasca biguttula*

(CABI: [Amrasca biguttula](#), Indian cotton jassid page)

Africa: Benin, Botswana, Cameroon, Côte d'Ivoire, Egypt, Gabon, Ghana, Kenya, Madagascar, Mozambique, Niger, South Africa, Tanzania

Asia: Afghanistan, Bangladesh, China, India, Indonesia, Iran, Iraq, Israel, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam

Caribbean: Anguilla, Antigua and Barbuda, Bahamas, Barbados, Cuba, Puerto Rico, Saint Kitts and Nevis, U.S. Virgin Islands

Central America: Honduras (Michel and Orozco 2025)

North America: Mexico, United States of America (Alabama, Florida, Georgia, North Carolina, Mississippi, South Carolina, Texas)

Oceania: Australia, Christmas Island, French Polynesia, Guam, Northern Mariana Islands

South America: Brazil

## Description (Madar and Katti 2011; Jayasimha et al. 2012; Santana-Nieves et al. 2025)

The following pictures can be used as a guideline for field identification, but authoritative identification requires microscopic examination of the genital structures of male specimens or molecular confirmation. Specimens on which regulatory decisions are based should be confirmed by the Florida Department of Agriculture and Consumer Services Division of Plant Industry (FDACS-DPI). No authoritative morphological identifications can be made from nymphs under any circumstances.

## Egg

The egg is yellowish, translucent and oval. It is inserted in plant tissue and not typically observed.

## Nymphs



Figure 1. The first instar is about 0.7 mm (0.03 in) in length with a pale yellowish-green body and conspicuous eyes.

Credit: Ryan Batts, UF/IFAS



Figure 2. The second instar is about 1.08 mm (0.04 in) in length with budding wing pads and eyes duller than the first instar.

Credit: Ryan Batts, UF/IFAS



Figure 3. The third instar is about 1.3 mm (0.05 in) in length, yellowish-green, with small wing pads.

Credit: Ryan Batts, UF/IFAS



Figure 4. The fourth instar is about 1.64 mm (0.06 in) in length with wing pads extending to the fourth abdominal segment.

Credit: Ryan Batts, UF/IFAS



Figure 5. The fifth instar can range from approximately 2.0 mm–2.28 mm (~1/16 in) in length, depending on host plant.

Credit: Ryan Batts, UF/IFAS

## Adult



Figure 6. Adults range in length from 2.1 to 2.7 mm (~1/16 in), with males tending to be smaller than females. Adults possess one spot toward the posterior end of each forewing in the brachial cell.

Credit: Ryan Batts, UF/IFAS



Figure 7. Adult *Amrasca biguttula*, dorsal view.  
Credit: Ryan Batts, UF/IFAS

### Distinguishing Males from Females



Figure 8. The end of the male abdomen (A) viewed from beneath is characterized by abundant long bristles whereas the female abdomen (B) has fewer, shorter white bristles and the pale brown ovipositor in the center (indicated by yellow arrow).

Credit: Ryan Batts, UF/IFAS

### Life Cycle

Female leafhoppers insert eggs inside plant tissue into leaf veins (Sharma and Singh 2002) or near leaf veins (DeLong 1971). Most life cycle studies of *Amrasca biguttula* describe five nymphal instars (Jayasimha et al. 2012; Madar and Katti 2011; Singh et al. 2018), although Nagrare et al. (2012) describe four. Most leafhoppers pass through five nymphal instars, but environmental conditions may result in four or six for some species (DeLong 1971).

Madar and Katti (2011) describe the temporal duration of each life stage of *Amrasca biguttula* on sunflower (*Helianthus annuus* L.), and Jayasimha et al. (2012) and

Singh et al. (2018) described life cycle parameters on okra. Each study was conducted at ambient (“room”) temperature, and temperature information was not provided. The mean duration of each life stage from these studies is presented in Table 2. Jayasimha et al. (2012) estimate the mean total nymphal period as 7.4 days on okra, whereas Madar and Katti (2011) estimate the mean total nymphal period as 14.8 days on sunflower. Madar and Katti (2011) and Jayasimha et al. (2012) concur that the average male lifespan is about 22 days, whereas Singh et al. (2018) recorded shorter lifespans for adults. Most studies report a pre-ovipositional period of about three days, and that females produce between sixteen and twenty offspring on average during their lifetime.

### Hosts

*Amrasca biguttula* has a very broad host range. Some common hosts and published references are included in Table 3.

### Economic Importance

Ahmed et al. (1985) present historical data from Pakistan indicating annual yield losses in cotton due to *Amrasca biguttula* ranging from 19% to 49%. In okra and eggplant, losses may reach up to 50% and 37%, respectively (Ahmed 1982). Specific yield loss data are not available for other crops; however, there is substantial documentation of *A. biguttula* as a serious economic pest of sunflower, hibiscus and pigeon pea (Ghani 1946; Kamble and Sathe 2015; Singh et al. 2018).

### Damage

*Amrasca biguttula* feeding damage causes hopperburn (necrosis and drying of leaf margins) (Figures 9 and 10); leaf yellowing and curling (Figure 11); and stunted growth. Many leafhoppers cause hopperburn, and symptoms can vary among different host plants. Leafhoppers are phloem feeders, and hopperburn is believed to result from a combination of toxins in the leafhopper saliva and the response mechanisms of the affected plant type (Backus et al. 2005). *Amrasca biguttula* can also contaminate plants and crops by producing honeydew, a substrate for sooty mold (Kamble and Sathe 2015).



Figure 9. Advanced hopperburn on eggplant from infestation with *Amrasca biguttula*.

Credit: Hugh Smith, UF/IFAS



Figure 11. *Amrasca biguttula* damage on hibiscus.

Credit: Hugh Smith, UF/IFAS



Figure 10. Hopperburn on okra from infestation with *Amrasca biguttula*.

Credit: Hugh Smith, UF/IFAS

## Management

Carbamate, neonicotinoid, organophosphate and pyrethroid insecticides are routinely used for management of *Amrasca biguttula* on cotton and okra in Asia; however, the development of resistance to these insecticide groups is common, particularly in cotton (Sagar and Balikai 2014). Presently, UF/IFAS researchers are evaluating conventional and biopesticides for management of *Amrasca biguttula* on ornamentals and vegetables in Florida, and tests on cotton are being conducted in Alabama and Georgia.

Generalist predators have been observed associated with *Amrasca biguttula* in Asia, and eggs are parasitized by trichogrammatid and mymarid parasitoids (Saeed et al. 2015; Adachi-Hagimor et al. 2020). There is presently limited information available on the potential of naturally occurring natural enemies to help suppress populations of *Amrasca biguttula* in Florida. It is noteworthy that populations of *Amrasca biguttula* are abundant on okra, eggplant and hibiscus in community gardens in Manatee County, where few or no insecticides are applied.

Varietal tolerance to *Amrasca biguttula* has been identified in eggplant (Bindra and Mahal 1981), cotton (Sharma 1983) and okra (Sandi et al. 2017), with tolerance primarily associated with increased length and density of leaf hairs.

## References

- Adachi-Hagimori, T., S. V. Triapitsyn, and T. Uesato. 2020. "Egg Parasitoids (Hymenoptera: Mymaridae) of *Amrasca biguttula* (Ishida) (Hemiptera: Cicadellidae) on Okinawa Island, a Pest of Okra in Japan." *Journal of Asia-Pacific Entomology* <https://doi.org/10.1016/j.aspen.2020.07.008>
- Ahmed, M. 1982. "Evaluation of Yield Losses in Brinjal (*Solanum melongena*) by *Amrasca devastans*." *Pakistan Journal of Agricultural Research* 3:277–280.
- Ahmed, Z., M. R. Attique, and A. Rashid. 1985. "An Estimate of the Loss in Cotton in Pakistan Attributable to the jassid *Amrasca devastans*." *Crop Protection* 5:105–108. [https://doi.org/10.1016/0261-2194\(86\)90089-X](https://doi.org/10.1016/0261-2194(86)90089-X)
- Backus, E. A., M. S. Serrano, and C. M. Ranger. 2005. "Mechanisms of Hopperburn: An Overview of Insect Taxonomy, Behavior and Physiology." *Annual Review of Entomology* 50:125–51. <https://doi.org/10.1146/annurev.ento.49.061802.123310>
- Bhatia, M. L. 1932. Report on Bionomics and Control of *Empoasca devastans* Dist. in the Punjab, Indian Central Cotton Committee, Bombay 1932 (cited in Ghani 1946).
- Bindra, O. S., and M. S. Mahal. 1981. "Varietal Resistance in Eggplant to the Cotton Jassid." *Phytoparasitica* 9:119–131. <https://doi.org/10.1007/BF03158454>
- CAPS. 2025. <https://approvedmethods.ceris.purdue.edu/sheet/2112>. Accessed 5 Sep 2025
- DeLong, D. M. 1971. The Bionomics of Leafhoppers." *Annual Review of Entomology* 16:179–210. <https://doi.org/10.1146/annurev.en.16.010171.001143>
- Esquivel, I. 2025. "Cotton Pest Update: Stink Bugs and New Invasive Cotton Pest – Two-Spotted Cotton Leafhopper, Moving into Cotton." Panhandle Ag e-News (blog) UF/IFAS Extension. <https://nwdistrict.ifas.ufl.edu/phag/2025/07/11/cotton-pest-update-stink-bugs-and-new-invasive-cotton-pest-two-spotted-cotton-leafhopper-moving-into-cotton/>
- Ghani, M. A. 1946. "Studies on Cotton Jassid (*Empoasca devastans*) in the Punjab." Cotton Research Laboratory. *Proceedings of the Indian Academy of Science* 24:260–263. <https://doi.org/10.1007/BF03049890>
- Jayasimha, G. T., R. R. Rachana, M. Manjuatha, and V. B. Rajkumar. 2012. "Biology and Seasonal Incidence of Leafhopper *Amrasca biguttula biguttula* (Ishida) (Hemiptera: Cicadellidae) on Okra." *Pest Management in Horticultural Ecosystems* 18:149–153.
- Kamble, C., and T. V. Sathe. 2015. "Incidence and Host Plants for *Amrasca biguttula* (Ishida) from Kolhapur Region, India." *International Journal of Development Research* 5:3658–3661.
- Liburd, O. E., S. E. Halbert, N. Samuels, and A. J. Dreves. 2024. "Two-Spot Cotton Leafhopper, Hemiptera: Cicadellidae, Typhlocybinae, Empoascini; *Amrasca biguttula* (Ishida)—a Serious Pest of Cotton, Okra and Eggplant That Has Become Established in the Caribbean Basin." Pest Alert. Florida Department of Agriculture and Consumer Services. <https://ccmedia.fdacs.gov/content/download/117692/file/two-spot-cotton-leaf-hopper-pest-alert.pdf>
- Madar, H., and P. Katti. 2011. "Biology of Leafhopper, *Amrasca biguttula* on Sunflower." *International Journal of Plant Protection* 4:370–373.
- Michel, M., and J. Orozco. 2025. "First Record of an Asian Leafhopper, *Amrasca biguttula* (Ishida) (Hemiptera: Cicadellidae), in Central America." *Insecta Mundi* 1147:1–8. <https://doi.org/10.64338/im.1147.s5ybr>
- Nagrare, V. S., K. D. Bisane, A. J. Deshmukh, and S. Kranthi. 2012. "Studies on Life Cycle Parameters of Cotton Leafhopper, *Amrasca biguttula biguttula* (Ishida)." *Entomon* 37:93–99.
- Saeed, R., M. Razaq, and I. C. W. Hardy. 2015. "The Importance of Alternative Host Plants as Reservoirs of the Cotton Leafhopper, *Amrasca devastans*, and Its Natural Enemies." *Journal of Pest Science* 88:517–531. <https://doi.org/10.1007/s10340-014-0638-7>
- Sagar, D., and R. A. Balikai. 2014. "Insecticide Resistance in Cotton Leafhopper *Amrasca biguttula*—A Review." *Biochemical and Cellular Archives* 14:283–294.
- Sandi, R. K., S. K. Sidhu, A. Sharma, N. Chawla, and M. Pathak. 2017. "Morphological and Biochemical Basis of Resistance in Okra to Cotton Jassid." *Phytoparasitica* 45:381–394. <https://doi.org/10.1007/s12600-017-0589-7>
- Santana-Nieves, A. G., I. Cabrera-Asencio, and E. Lasalle-Loperena. 2025. "Field Guide de *Amrasca biguttula*: Symptoms Caused by Adults and Nymphs of *Amrasca biguttula* on Different Hosts in Puerto Rico." University of Puerto Rico Agricultural Experiment Station. <https://hdl.handle.net/20.500.11801/7468>
- Sharma, A., and R. Singh. 2002. "Oviposition Preference of Cotton Leafhopper in Relation to Leaf-Vein Morphology." *Journal of Applied Entomology* 126:538–544. <https://doi.org/10.1046/j.1439-0418.2002.00697.x>
- Sharma, H. C. 1983. "Role of Some Chemical Components and Leaf Hairs in Varietal Resistance in Cotton to Jassid,

*Amrasca biguttula biguttula* Ishida." *Journal of Entomological Research*. 7:145–149.

Singh, A., J. Singh, K. Singh, and P. Rani. 2018. "Host Range and Biology of *Amrasca biguttula biguttula* (Hemiptera: Cicadellidae)." *International Journal of Environment, Ecology, Family and Urban Studies* 18:19–24.  
<https://doi.org/10.24247/ijeefusapr20183>

Subba Rao, B. R., B. Parshad, A. Ram, R. P. Singh, and M. L. Srivasta. 1968. "Distribution of *Empoasca devastans* and Its Egg Parasites in the Indian Union." *Entomologia Experimentalis et Applicata* 11:250–254.  
<https://doi.org/10.1111/j.1570-7458.1968.tb02050.x>

Xue, Y., Y. Wang, C. H. Dietrich, M. J. Fletcher, and D. Qin. 2017. "Review of Chinese Species of the Leafhopper Genus *Amrasca* Ghauri (Hemiptera, Cicadellidae, Typhlocybinae), with Description of a New Species, Species Checklist and Notes on the Identity of the Indian Cotton Leafhopper." *Zootaxa* 4353:360–370.  
<https://doi.org/10.11646/zootaxa.4353.2.7>

## Tables

Table 1. Length in mm\* of different life stages of *Amrasca biguttula*

Mean ( $\bar{x}$ ) length $\pm$ SEM (mm)		
Life stage	Madar and Katti (2011)	Jayasimha et al. (2012)
	sunflower	okra
Egg	0.61 $\pm$ 0.05	Not measured
1st instar	0.68 $\pm$ 0.05	0.68–0.71
2nd instar	1.08 $\pm$ 0.02	1.08–1.12
3rd instar	1.30 $\pm$ 0.05	1.28–1.36
4th instar	1.64 $\pm$ 0.06	1.56–1.72
5th instar	2.06 $\pm$ 0.02	2.25–2.29
Adult male	2.10 $\pm$ 0.06	2.61–2.65 (sexes not measured separately)
Adult female	2.74 $\pm$ 0.13	

\*Note: 2 mm ~ 1/16 in.

Table 2. Mean ( $\bar{x}$ ) of life stage in days ( $\pm$  SEM)

Life stage	Madar and Katti (2011) on sunflower	Jayasimha et al. (2012) on okra	Singh et al. (2018) on okra
Egg	6.8 $\pm$ 0.5	6.4 $\pm$ 0.4	5.1 $\pm$ 1.1
1st instar	3.6 $\pm$ 0.5	1.5 $\pm$ 0.3	2.1 $\pm$ 0.7
2nd instar	3.1 $\pm$ 0.2	1.2 $\pm$ 0.2	3.5 $\pm$ 1.0
3rd instar	3.6 $\pm$ 0.5	1.2 $\pm$ 0.4	3.7 $\pm$ 1.1
4th instar	1.8 $\pm$ 0.4	1.6 $\pm$ 0.4	4.4 $\pm$ 1.1
5th instar	2.8 $\pm$ 0.4	2.0 $\pm$ 0.3	4.7 $\pm$ 1.0
Adult male	22.8 $\pm$ 1.5	22.9 $\pm$ 1.9	15.8 $\pm$ 1.6
Adult female	26.0 $\pm$ 1.7	26.7 $\pm$ 1.9	18.7 $\pm$ 1.8

Table 3. A partial list of common host plants of *Amrasca biguttula*

Botanical family	Scientific name	Common name	Source
Amaranthaceae	<i>Achyranthes aspera</i> L.	chaff flower	Saeed et al. 2015
Asteraceae	<i>Cynara cardunculus</i> var <i>scolymus</i> L.	artichoke	Bhatia 1932 in Ghani 1946
	<sup>P</sup> <i>Helianthus annuus</i> L.	common sunflower	Ghani 1946
	<i>Xanthium strumarium</i> L.	cocklebur	Saeed et al. 2015
	<i>Calendula officinalis</i> L.	marigold	Singh et al. 2018
Brassicaceae	<i>Raphanus sativus</i> L.	radish	Singh et al. 2018
Chenopodiaceae	<i>Chenopodium murale</i> L.	nettle leaved goosefoot	Saeed et al. 2015
Cucurbitaceae	<i>Cucumis sativus</i> L.	cucumber	Saeed et al. 2015
	<i>Cucumis melo</i> L.	muskmelon	Saeed et al. 2015

Botanical family	Scientific name	Common name	Source
	<i>Citrullus lanatus</i> (Thumb) Mansf.	watermelon	Saeed et al. 2015
Euphorbiaceae	<i>Ricinus communis</i> L.	castor bean	Subba Rao et al. 1968
Fabaceae	<i>Arachis hypogaea</i> L.	peanut	Singh et al. 2018
	<i>Glycine max</i> (L.) Merr.	soybean	Singh et al. 2018
	<i>Vigna unguiculata</i> subsp. <i>cylindrica</i> (L.) Walp.	cowpea (catjang)	Subba Rao et al. 1968
	<i>Vigna radiata</i> (L.) R. Wilczek	mung bean	Singh et al. 2018
	<i>Pisum sativum</i> L.	pea	Saeed et al. 2015
	<i>Cajanus cajan</i> (Millsp)	pigeon pea	Kamble and Sathe 2015
Malvaceae	<sup>P</sup> <i>Gossypium hirsutum</i> L.	cotton	Subba Rao et al. 1968
	<i>Alcea rosea</i> L.	hollyhock	Ghani 1946
	<i>Abutilon indicum</i> (L.) Sweet	mallow	Saeed et al. 2015
	<sup>P</sup> <i>Abelmoschus esculentum</i> L.	okra	Subba Rao et al. 1968
	<i>Hibiscus mutabilis</i> L.	cotton rose	Ghani 1946
	<i>Hibiscus rosa sinensis</i> L.	Chinese hibiscus	Kamble and Sathe 2015
	<i>Hibiscus sabdariffa</i> L.	roselle	Liburd et al. 2024
	<i>Hibiscus tiliaceus</i> L.	sea hibiscus	Ghani 1946
	<i>Corchorus</i> spp. L.	jute	Xue et al. 2017
Poaceae	<i>Cynodon dactylon</i> (L) Pers.	Bermuda grass	Kamble and Sathe 2015
	<i>Chloris gayana</i> Kunth	Rhodes grass	Singh et al. 2018
	<i>Sorghum bicolor</i> (L.) Moench	sorghum	Singh et al. 2018
	<i>Zea mays</i> L.	corn	Singh et al. 2018
Solanaceae	<sup>P</sup> <i>Solanum melongena</i> L.	eggplant	Subba Rao et al. 1968
	<i>Datura metel</i> L. var. <i>Fastuosa</i>	devil's trumpet	Saeed et al. 2015
	<i>Solanum tuberosum</i> L.	potato	Subba Rao et al. 1968
	<i>Nicotiana tabacum</i> L.	tobacco	Saeed et al. 2015
<sup>P</sup> indicates a preferred U.S. host (CAPS 2025).			

<sup>1</sup> This document is EENY-827, one of a series of the Department of Entomology and Nematology, UF/IFAS Extension. Original publication date March 2026. Visit the Ask IFAS website at <https://ask.ifas.ufl.edu/> for the currently supported version of this publication. © 2026 UF/IFAS. This publication is licensed under [CC BY-NC-ND 4.0](#).

<sup>2</sup> Hugh A. Smith, professor, vegetable entomology, Department of Entomology and Nematology, UF/IFAS Gulf Coast Research and Education Center, Wimauma, FL; Yisell Velazquez-Hernandez, biological scientist II, ornamental plant entomology, UF/IFAS Tropical Research and Education Center, Homestead, FL; Alexandra M. Revynthi, assistant professor, agricultural acarology, Department of Entomology and Nematology, UF/IFAS Tropical Research and Education Center, Homestead, FL; UF/IFAS Extension, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office. U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Andra Johnson, dean for UF/IFAS Extension.