

# Spined Soldier Bug, *Podisus maculiventris* (Say) (Insecta: Hemiptera: Pentatomidae)<sup>1</sup>

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## Introduction

The spined soldier bug, *Podisus maculiventris* (Say), is a medium-sized predatory stink bug that preys on a wide variety of other arthropods, especially larval forms of Lepidoptera and Coleoptera (Mukerji and LeRoux 1965). The adult has a prominent spine on each “shoulder.”

## Distribution

This stink bug is the most common predatory stick bug in North America and ranges from Mexico, the Bahamas, and parts of the West Indies, north into Canada. It has also been introduced into other countries as part of classical biological control programs (De Clercq 2008).

## Description

### Egg

The egg is approximately 1 mm in diameter, with long projections around the operculum that are especially characteristic of *Podisus* spp. Eggs are laid 17 to 70 at a time in loose oval masses.



Figure 1. Dorsal view of an adult spined soldier bug, *Podisus maculiventris* (Say), feeding on a mating pair of sumac flea beetles, *Blepharida rhois* (Forster) (Coleoptera: Chrysomelidae). Credits: Lyle J. Buss, University of Florida

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Figure 2. Eggs of the spined soldier bug, *Podisus maculiventris* (Say).  
Credits: Veronika Ronkos

### 1st Instar

This instar has a length of 1.3 to 1.5 mm. The head width, including the eyes, is 0.6 mm, and the humeral width is 0.9 mm. The 1st instar nymph of *Podisus maculiventris* has a blackish head and thorax and reddish abdomen with black dorsal and lateral plates.



Figure 3. First instar nymphs of the spined soldier bug, *Podisus maculiventris* (Say).  
Credits: Michael R. Patnaude



Figure 4. Size of first instar nymphs of the spined soldier bug, *Podisus maculiventris* (Say).  
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### 2nd Instar

This instar has a length of 2.5 to 3.0 mm. The head width is 0.9 mm and the humeral width is 1.3 mm. As in other asopine nymphs, the 2nd instar nymph feeds on other insects. This species is highly cannibalistic. The 2nd instar resembles the 1st instar.



Figure 5. Second instar nymph of the spined soldier bug, *Podisus maculiventris* (Say).  
Credits: Michael R. Patnaude

### 3rd Instar

This instar has a length of 3.5 to 4.0 mm. The head width is 1.3 mm and the humeral width is 2.0 mm. The 3rd instar nymph has a black head and thorax while the abdomen is reddish with black, orange and white maculations (markings). The central bar-shaped markings are white and the lateral markings are orange.



Figure 6. Third instar nymph of the spined soldier bug, *Podisus maculiventris* (Say).  
Credits: Michael R. Patnaude



## 4th Instar

This instar has a length of approximately 6 mm. The head width is 1.7 mm and the humeral width is 3.2 mm. The colorations and patterns of the 4th instar nymph are similar to that of the 3rd instar nymph, but the wing pads become noticeable.



Figure 7. Fourth instar nymph of the spined soldier bug, *Podisus maculiventris* (Say).

Credits: Michael R. Patnaude

## 5th Instar

This instar has a length of 8 to 10 mm. The head width is 2.2 mm and the humeral width is 4.8 mm. The wing pads are prominent in the 5th instar, and the head and thorax become mottled with brown. The abdominal markings are white or tan, and black.



Figure 8. Fifth instar nymph of the spined soldier bug, *Podisus maculiventris* (Say).

Credits: Michael R. Patnaude

## Adult

The adult male is approximately 11 mm long. The head width is 2.3 mm and the humeral width, including spines, is 7.6 mm. Females are slightly larger (De Clercq 2008). Adult *Podisus maculiventris* resemble the adult *Alcaeorrhynchus grandis* (Dallas) in being mottled brown in color, but *Alcaeorrhynchus grandis* adults are over 15 mm long and have only one spine on each humeral angle. These spines project outward, not forward as in *Podisus macronatus* Uhler. Each hind femur of *Podisus maculiventris* has two blackish dots at apical 3rd.



Figure 9. Dorsal view of a spined soldier bug, *Podisus maculiventris* (Say).

Credits: Michael R. Patnaude



Figure 10. Front lateral view of a spined soldier bug, *Podisus maculiventris* (Say).

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## Life Cycle

Kirkland (1896), Stoner (1930), Esselbaugh (1949), Mukerji and LeRoux (1965), Warren and Wallis (1971) and Richman and Whitcomb (1978) reported on the rearing of *Podisus maculiventris*. Their studies differed markedly in temperatures and photoperiods, consequently the time from egg to adult varied from 27 to 38 days, with the egg stage lasting five to nine days. The shortest time was

reported for Florida specimens (Richman and Whitcomb 1978). Reported longevity for adults are from one to four months (De Clercq 2008).

Early instars are highly gregarious and usually remain in the same location. However, they become more solitary with each molt.

Food consumption, prey size, and energetics of *Podisus maculiventris* were detailed by Mukerji and LeRoux (1969a, b, c). The work by Couturier (1938) is a landmark study on the bionomics of this bug. Records in the Florida State Collection of Arthropods indicate that *Podisus maculiventris* is active all year in peninsular Florida, but often does not appear until spring in the “panhandle” counties. In Canada and the northern or central US, the spined soldier bug usually has two to three generations per year and hibernates as an adult from October to April (De Clercq 2008).

## Economic Importance

This insect is a generalist predator with a broad host range, reportedly attacking 90 insect species over eight orders (De Clercq 2008), including several important economic pests. Reported prey include the larvae of Mexican bean beetle, European corn borer, diamondback moth, corn earworm, beet armyworm, fall armyworm, cabbage looper, imported cabbageworm, Colorado potato beetle, velvetbean caterpillar, and flea beetles (Hoffmann and Frodsham 1993). When prey is scarce, the spined soldier bug may feed on plant juices, but this feeding is not reported to cause plant damage (De Clercq 2008).

*Podisus maculiventris* is associated with several crops including alfalfa, apples, asparagus, beans, celery, cotton, crucifers, cucurbits, eggplant, onions, potatoes, soybeans, sweet corn and tomatoes (Stoner 1930, Hayslip et al. 1953, Whitcomb 1973, Deitz et al. 1976, Hoffmann and Frodsham 1993).

The effectiveness of this species in preying on economic pests resulted in its use in classical biological control programs in other countries, including Eastern Europe and Russia. However, this has not been successful in colder climates, perhaps due to this species’ inability to overwinter. *Podisus maculiventris* eggs are also sold commercially for use in control programs and this has proven successful in controlling pests in European and North American heated greenhouses. Use in large area field crops is often not economically viable due to the production costs of raising the bug. In addition, naturally occurring populations often are not numerous enough to overpower large populations

of pests in the spring. Pheromones have been used to draw naturally occurring and newly emerging populations of this stink bug to target crops in the spring (De Clercq 2008).

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