

## **Identification notes for *Spodoptera litura* and *Spodoptera littoralis* (Lepidoptera: Noctuidae) and some native *Spodoptera* moths**

### **Introduction**

The purpose of this handout is to help you distinguish two exotic *Spodoptera* moths of concern to U.S. agriculture, *S. litura* and *S. littoralis*, from native species, some of which are strongly attracted to the lure employed in early detection surveys. They are the targets for early detection surveys.

This handout complements other sources of information and does not replace them. It illustrates forewing details that can help you understand various published keys and simplifies screening efforts.

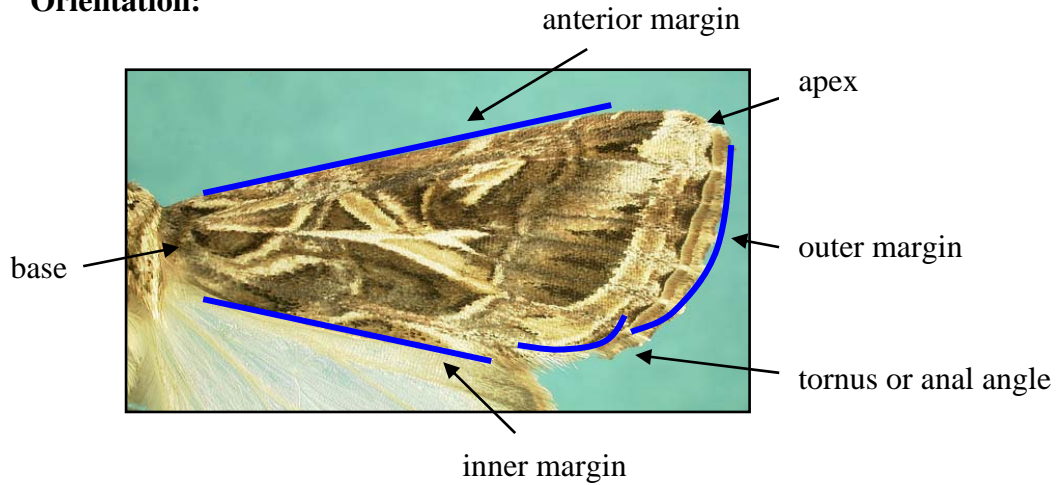
**Part 1** presents basic forewing orientation and some wing color pattern nomenclature.

**Part 2** illustrates the forewing of the two exotic species of concern.

**Part 3** introduces some of the native species with shortcuts for how to identify them based on forewing color patterns.

## Part 1: Terminology of some wing characters

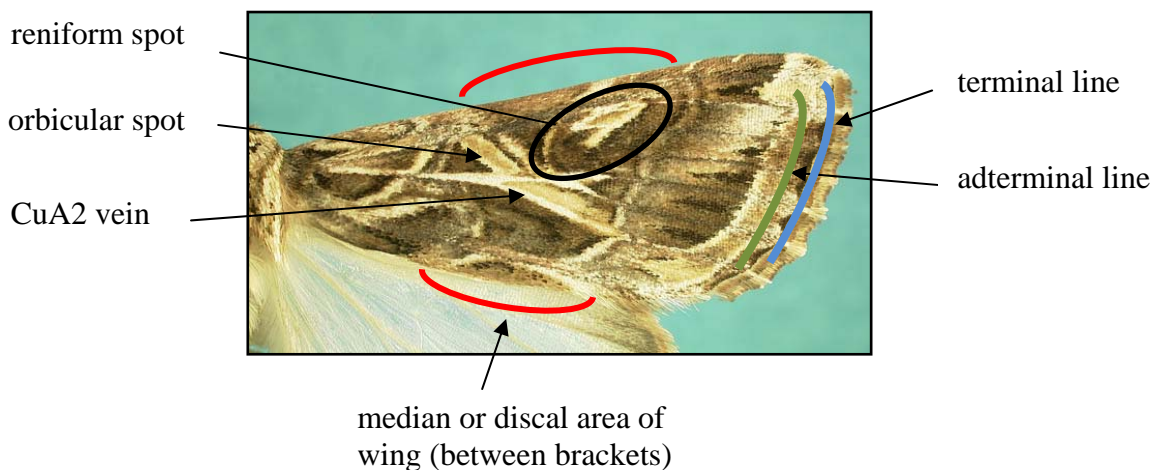
### Orientation:



← basal vs apical →

- The anterior margin is the leading edge of the wing and is also known as the costal margin.
- The inner margin is the part of the wing adjacent to the body when the moth is at rest and is also known as the posterior or anal margin.
- The outer margin is the farthest edge of the wing and is also known as the distal or apical margin.
- The apex is the tip of the wing, where the anterior and outer margins meet.
- The base is the wing part closest to the body.

### Transverse lines:

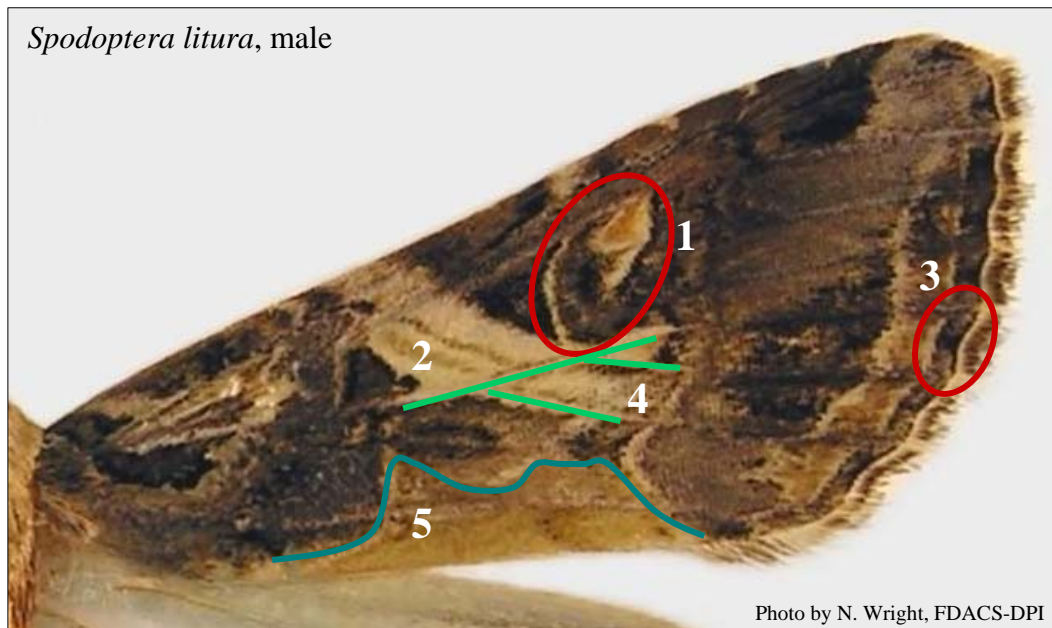


## Part 2: How to distinguish the two survey targets

### *Spodoptera litura*

Below are some characters that are useful to distinguish *Spodoptera litura* from other *Spodoptera* species. The forewings need to be examined carefully because of their color variation and similarity to other non-indigenous as well as native species. For final identification it is necessary that the genitalia are dissected.

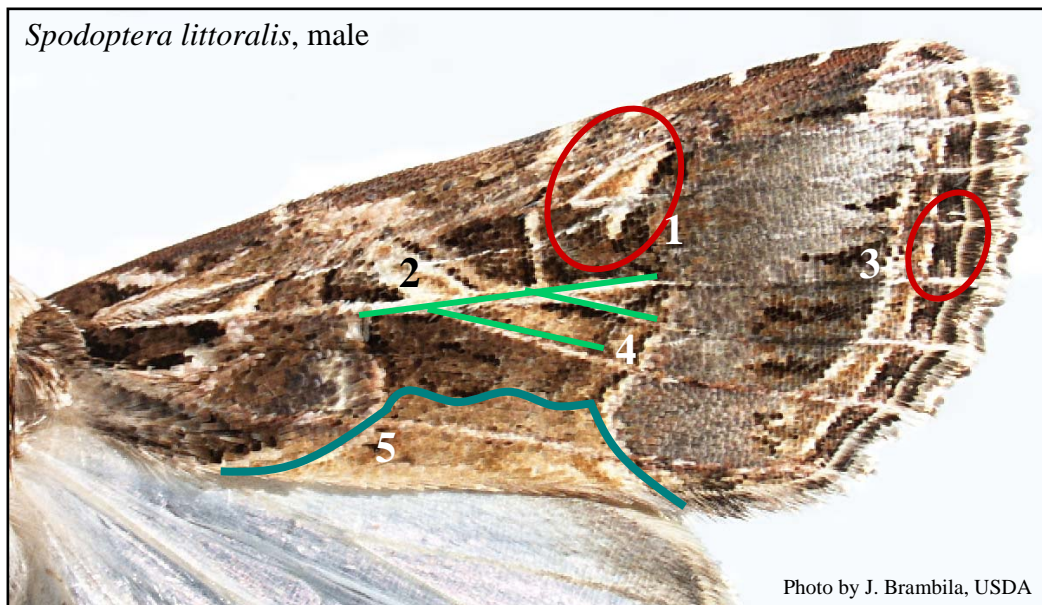
1. Reniform spot brown, outlined in white, followed by black, with a white-margined light brown area at apex, somewhat like a letter “A”.
2. Orbicular spot elongate, narrow, oblique, light brown and outlined with a white margin.
3. A row of dark brown or black hour-glass markings along outer margins (between terminal and adterminal lines, and between veins).
4. A white fork in the median area of the wing. The fork is made of portions of veins M3, CuA1, and CuA2.
5. A large yellowish or light brown patch on the median area adjacent to inner margin. This patch is not present in females.



## *Spodoptera littoralis*

Below are five characters that in combination aid in distinguishing this non-indigenous species from some other *Spodoptera* species. However, due to its similarities to some native and non-indigenous species and to its variability in color it is essential that genitalic structures are dissected and examined for final identification.

1. Reniform spot with an apical marking in the form of white tilted letter “A”, filled with light brown.
2. Orbicular spot elongate, oblique, narrow, light brown and outlined with a white margin.
3. A row of dark brown or black hour-glass markings along outer margins (between terminal and adterminal lines).
4. A white fork in the median area of the wing. The fork is made of parts of veins M3, CuA1, and CuA2.
5. A large yellowish or light brown patch on the median area adjacent to inner margin. Females lack this patch.

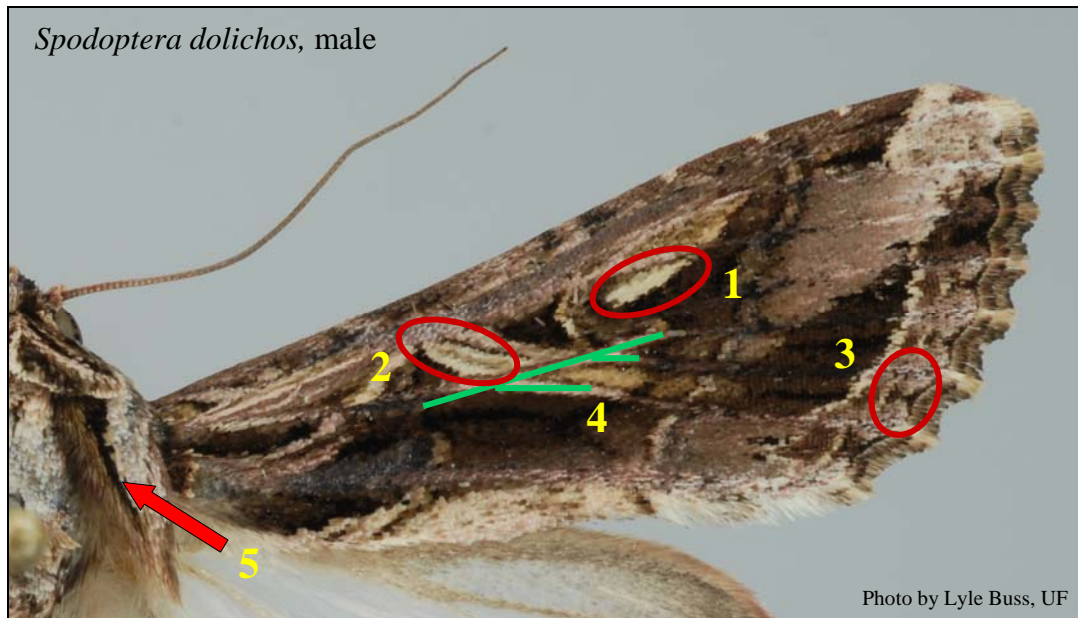


### Part 3: How to distinguish some native species

#### *Spodoptera dolichos*

One of the characters that helps to distinguish *S. dolichos* from other *Spodoptera* species is not located on the wings but on the thorax, but it can only be observed if the specimens are in good condition. By its larger size, it can be distinguished from *S. pulchella*, which is much smaller. Females do not differ from males, and color variation is not strong in *S. dolichos*. However, a heavily damaged specimen looks extremely close to either of the target species; so, genitalic dissections are necessary.

1. Reniform spot with a solid, elongate, creamy white dash that is quite distinctive.
2. Orbicular spot elongate, very narrow, oblique, light brown and outlined with white margins.
3. A row of dark brown or black narrow hour-glass markings along the wing margin (between terminal and adterminal lines).
4. A creamy white fork in the center of the wing.
5. A dark stripe followed by a narrow black stripe dorsally on each side of the thorax. This is the most distinctive marking on this species.



## *Spodoptera ornithogalli*

Below are some characters that help distinguish *S. ornithogalli* from other *Spodoptera* species. Because of color variation and its strong similarity to the two target species, dissections are needed. Its genitalic characters are so similar to *S. pulchella*'s that examination of the forewings is essential (if the specimen in question was collected in south Florida, where *S. pulchella* occurs); however, *S. pulchella* is smaller. It is distinguished from *S. dolichos* by the noticeable lack of black stripes on the thorax.

1. Reniform spot with an apical marking in the form of a white tilted letter "A", filled with light brown.
2. Orbicular spot elongate, narrow, oblique, light brown and outlined with a white margin.
3. A row of dark brown or black flattened triangles (or crescents) along the terminal line between the veins. This is the most important character (which is lost if the wings are damaged).
4. A whitish fork with three prongs in the median area of the wing. The fork is made of parts of veins M3, CuA1, and CuA2.
5. A large yellowish or light brown patch on the median area adjacent to inner margin. This area is not yellowish brown in females.

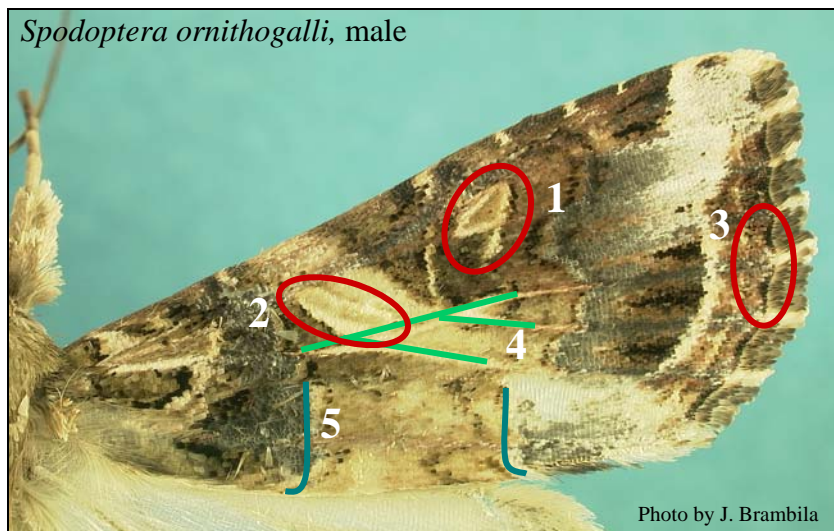
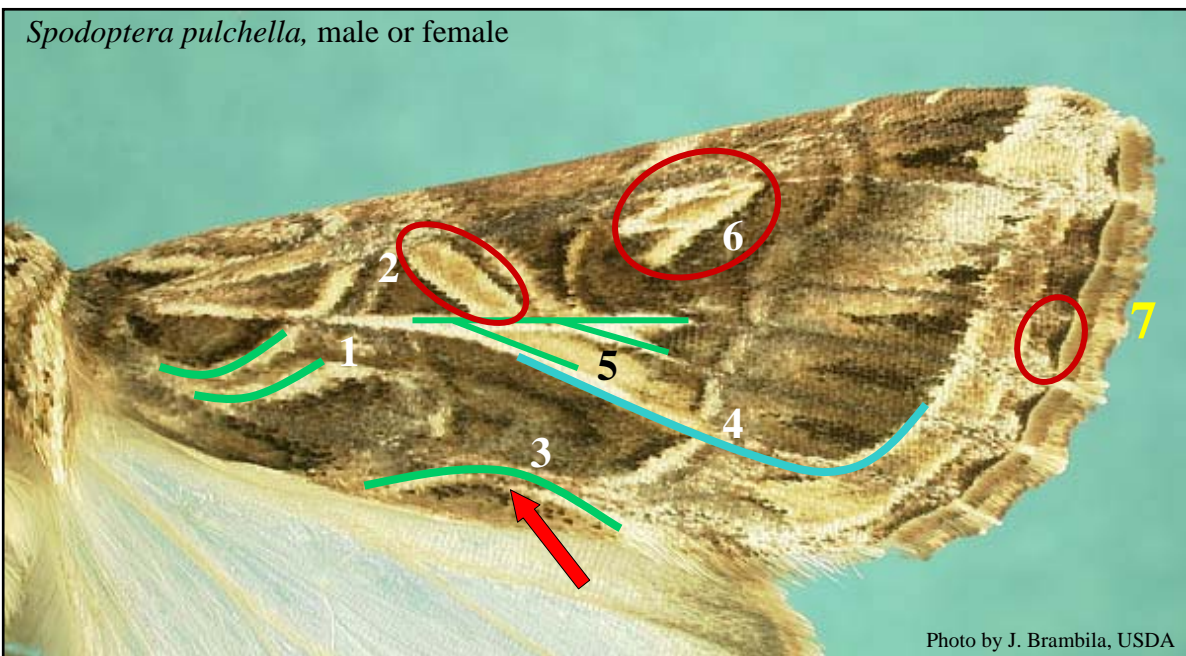


Photo from  
[www.inra.fr/papillon/noctuid/amp\\_hipyr/texteng/s\\_ornith.ht](http://www.inra.fr/papillon/noctuid/amp_hipyr/texteng/s_ornith.ht)

## *Spodoptera pulchella*

Below are seven characters that in combination distinguish this species from all other *Spodoptera* species. Females and males have the same color pattern.

1. Two parallel upcurved lines near the base of the forewing.
2. Orbicular spot elongate and oblique, light brown, outlined in white and black.
3. A white down-curved line on the middle of the inner margin of the wing enclosing a light brown area; the curve is usually bordered by black on the inside. This is the most important character.
4. A continuous white line from the orbicular spot toward the postmedial area of the wing, curving upwards.
5. A whitish fork with three prongs in the median area of the wing. The fork is made of parts of veins M3, CuA1, and CuA2.
6. Reniform spot with an apical marking in the form of a white tilted letter “A”, filled with light brown.
7. A row of dark brown markings along the terminal line; the markings are crescents or flat triangles.

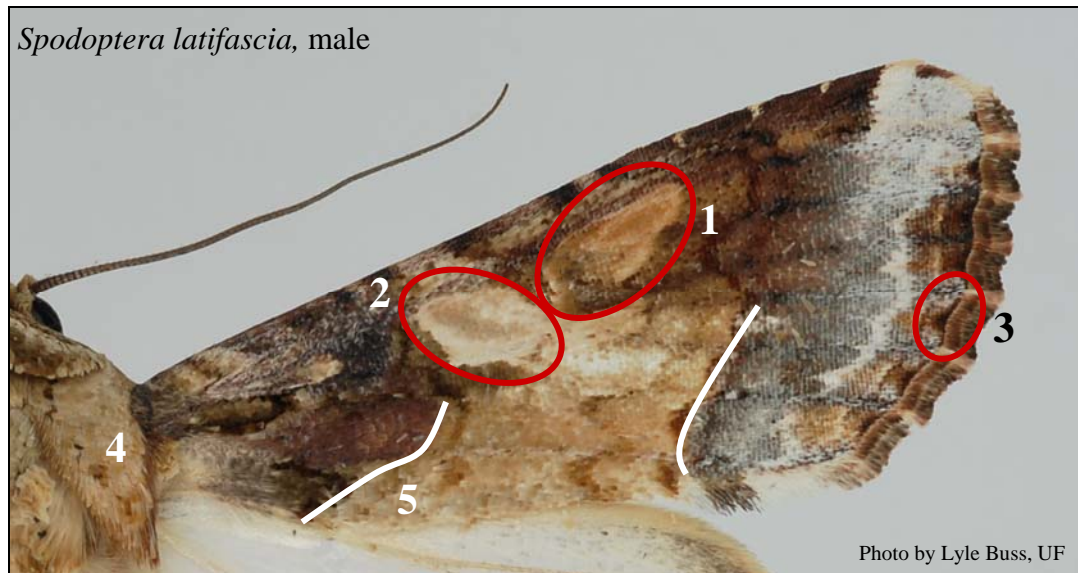


The most distinctive marking in *Spodoptera pulchella* is the curved white line along the inner margin of the forewing

## *Spodoptera latifascia*

*Spodoptera latifascia* is as large as (or larger than) *S. dolichos*, *S. ornithogalli*, *S. litura* and *S. littoralis*. It differs from *S. dolichos* strongly by the absence of the brown and black stripes on the thorax. Females differ strongly from males in lacking a large yellowish brown patch adjacent to the inner margin, and other characters. Color variation is common in this species. Damaged specimens look extremely close to either of the target species; so, genitalic dissections are recommended. The following list of characters is in reference to males.

1. Reniform spot large, oval, yellowish brown.
2. Orbicular spot large, oval, oblique, with a white margin.
3. Dark brown or black markings along the wing margin (not exactly hour-glass shaped, but in between crescent and hour-glass).
4. Dark stripes absent from the thorax.
5. A large yellowish brown patch on the median area adjacent the inner margin.





## *Spodoptera frugiperda*

*Spodoptera frugiperda* has some white and brown transverse lines and markings on the forewings but they are not as contrasting as in other *Spodoptera* species. The brown background color is variable from grayish brown to rust brown. Furthermore, males and females differ strongly in that females have indistinct wing markings. This species is much smaller than the species that have contrasting forewing markings. Genitalic dissection is recommended for final identification of this species. Black dashes or bars are not present at the base of the wing.

1. Reniform spot indistinct, partially outlined in black, with a small, sideways v-shaped marking (see arrow).
2. Orbicular spot light brown, oval, oblique, and not as narrow as in the species with strongly contrasting transverse lines.
3. Row of small, black, hour-glass shaped markings near apical margin of the wing.



female

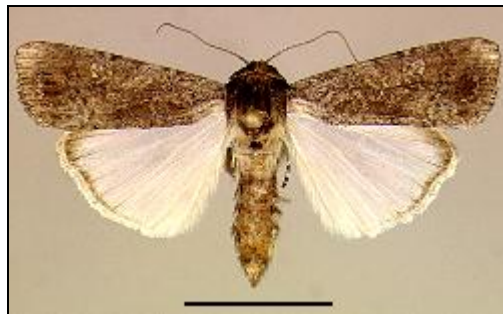


Photo from [www.inra.fr/papillon/noctuid/amphipyrt/texteng/s\\_frugip.htm](http://www.inra.fr/papillon/noctuid/amphipyrt/texteng/s_frugip.htm)

## *Spodoptera eridania*

*Spodoptera eridania* belongs in the subgroup of *Spodoptera* moths that lack contrasting (black, brown, white) transverse lines on the forewings. The forewing is usually dark gray or brown, or a combination of both colors. Much color variation is known for both males and females. The two most common forms are illustrated here.

1. Reniform spot in the form of a black or dark brown streak or spot. This is the most diagnostic character.
2. Short black dash near base of wing along the inner margin.

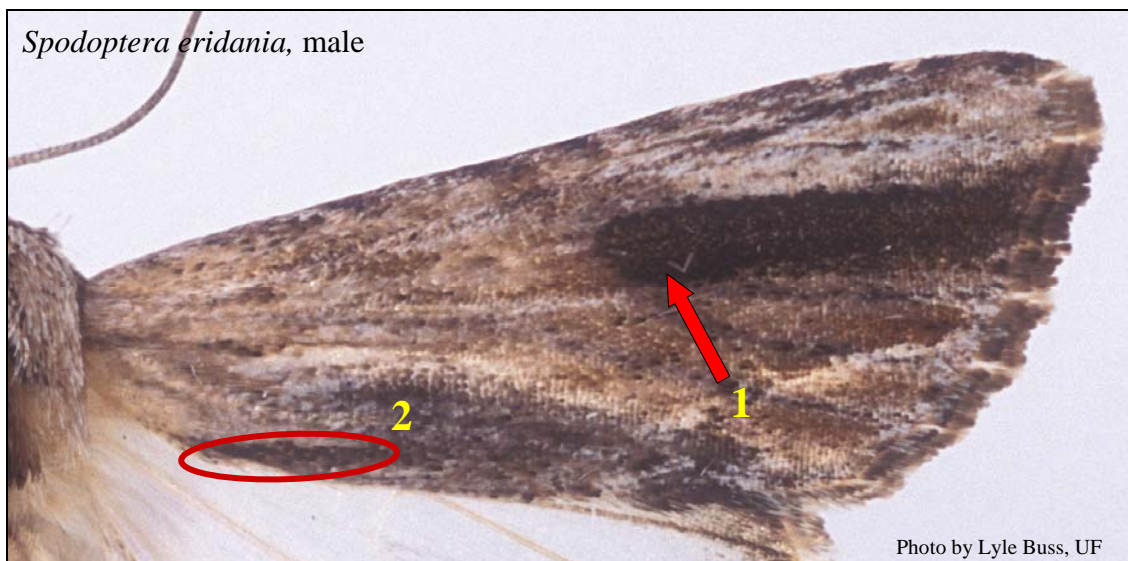


Photo from [www.inra.fr/papillon/noctuid/amphipyr/texteng/s\\_eridan.htm](http://www.inra.fr/papillon/noctuid/amphipyr/texteng/s_eridan.htm)

## *Spodoptera albula*

*Spodoptera albula* belongs in the subgroup of *Spodoptera* species that lack contrasting transverse (brown, black, white) lines on the forewings. It is much smaller than the targets (*S. litura* and *S. littoralis*). Males and females are similar, and the forewings are usually pale gray.

1. Short, narrow black dash at base of wing. This is the primary character.
2. Reniform spot round and black, diffuse or absent.



Photo from [www.inra.fr/papillon/noctuid/amhipyr/texteng/s\\_albula.htm](http://www.inra.fr/papillon/noctuid/amhipyr/texteng/s_albula.htm)

## *Spodoptera exigua*

*Spodoptera exigua* belongs in the subgroup of *Spodoptera* moths that lack contrasting transverse (black, brown, white) lines on the forewings. Males and females are similar, and neither shows much color variation. Black dashes at the base of the forewing are absent. This moth is much smaller than the targets.

1. Background gray or light brown without bold black, brown and white stripes.
2. Orbicular spot round and light or yellowish brown with a white margin, surrounded by a thin black margin.

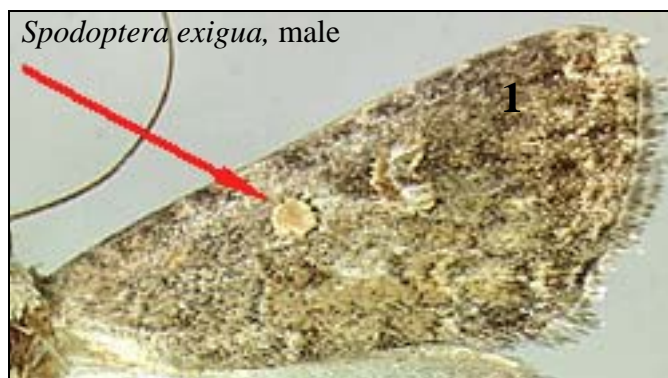


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**Acknowledgements:** I thank Lyle Buss (University of Florida, Entomology and Nematology Department) for sharing excellent photographs of pinned moths. Some photographs were used, with permission, from the French National Institute for Agriculture Research ([www.international.inra.fr](http://www.international.inra.fr)).