

Field Key to Late Instars of *Spodoptera* of America North of Mexico

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The following key, based on Levy and Habeck (1976), Passoa (1991), Godfrey (1987), and Pogue (2002), will facilitate the identification of ten *Spodoptera* species known to occur in the continental United States and Canada. It also functions as a screening aid to help recognize two exotic species, *S. litura* and *S. littoralis*, which are sometimes encountered in the eastern United States.

To simplify the key, emphasis is placed on the most frequently encountered color forms. Keep in mind that the markings in *Spodoptera* are often highly variable, e.g., exceptions and intergrades in shapes of the dorsal markings are common. Endeavor to secure and examine more than a single individual whenever possible—a reasonable population sample should include forms that will key correctly and hence the key will allow extension entomologists, regulatory officials, and others to take appropriate action. The key is living late instars; consult the text and photographs in Pogue (2002) for preserved larvae in alcohol between shapes. We also caution that color variation in *Spodoptera androgea*, *S. littoralis*, and *S. pulchella* is incompletely known.

Additional introductory text, tips for using the key, and expanded couplets for Passoa's key are posted at (www.eeb.uconn.edu/people/wagner/). Navigate to Owllet Caterpillars of Eastern North America (Lepidoptera: Noctuidae) to locate active links for "Field Key to Late Instars of *Spodoptera* of America North of Mexico." Periodically we will post updated versions of both keys on the website, e.g., were a new *Spodoptera* to become established. A simplified key to the seven widely established *Spodoptera* in Florida was authored by (Heppner 1998) (see: www.doacs.state.fl.us/pi/enpp/ento/entcirc/ent390.pdf).

- 1 Dorsal abdominal pinacula larger than diameter of spiracles on A1-7, these pinacula either conspicuous (brown or black color forms) or pale (green color form) (typically pinacula over A8 and A9 most conspicuous) *frugiperda*
- 1' Dorsal abdominal pinacula inconspicuous and smaller than the diameter of spiracles on A1-7..... 2
- 2 Mesothoracic lateral dark spot normally present; black dorsal spots over abdominal segments usually absent or represented by series of dashes *exigua*
- 2' Mesothoracic lateral dark spot almost always absent (present in *praefica* from western USA) (spot on A1 commonly present); abdominal dorsum with either triangular markings or no markings 3
- 3. Dorsal triangle on A1 larger than the dorsal triangle of A6 or triangles present only on A1 and A8 4
- 3' Dorsal triangle on A1 absent, equal to, or smaller than the dorsal triangle of A6 6
- 4 Spiracular stripe less intense in front of lateral dark spot on A1 than behind it; if lateral dark spot or spiracular stripe on A1 absent, then dorsal triangles lack white spots at their apex; usually light orange-brown; native to US *eridania*
- 4' Spiracular stripe continues uninterrupted in intensity along thorax and abdomen; dorsal triangles, especially those over T2 and T3, with dorsal white at their apex; head

- usually dark; Old Worlds species, most likely to be found in imported produce and nursery stock 5
- 5** Ground color usually brown or gray, rarely green; subdorsal area strongly contrasting with paler dorsum; middorsal line usually absent; spiracular stripe uninterrupted; dorsal triangular markings usually present only on A1 and A8, or just A8; if abdominal segments have black dorsal triangular markings, then these lack white spot at their apex; found once in Ohio greenhouses and then eradicated *littoralis*
- 5'** Ground color varies from green to brown; subdorsal area not strongly contrasting with paler dorsum; middorsal line often present; spiracular stripe often interrupted on A1 by a black band or spot; at least some dorsal triangular markings with a white spot at their apex, these triangles either found on all abdominal segments, or on just on A1 and A8; twice identified from south Florida *litura*
- 6** Mesothoracic marking trapezoid and equal in size to dorsal triangle on A8 6
- 6'** Mesothoracic marking usually triangular or hemispherical, rarely reduced to white spot or small trapezoid; these markings smaller than dorsal triangles over A8 8
- 7** Larva from south Florida *androgea* or *dolichos* (see text)
- 7'** Larva from central Florida northward and westward, but infrequent north of Gulf States *dolichos*
- 8** Dorsal abdominal triangles with single white spot at middle or close to apex; if dorsal abdominal triangles absent then at least some white spots bordered with black semicircles *albula*
- 8'** Dorsal abdominal triangles solid or with either lines, many fine spots, or dashes passing through them, rarely with single white spot; if triangles include a single white spot, then these spots smaller than half diameter of spiracles of A1-7; rarely white dashes may be present at the base of the dorsal triangles; if dorsal abdominal triangles absent then white spots never bordered with black semicircles 9
- 9** Dorsal abdominal triangles absent on A1, thin or absent on A2, and with several thin narrow lines passing through them on other segments; south Florida *pulchella*
- 9'** Dorsal abdominal triangles either present on A1-2, or if dorsal triangles are absent on A1-2, then any remaining dorsal triangles lack thin narrow lines passing through them; widely distributed throughout the United States 10
- 10** T2 with small dark lateral rectangular spot; restricted to the western United States (southern Canada south into Mexico west to Pacific Coast; one record from Kansas) *praefica*
- 10'** T2 lacks small dark lateral rectangular spot; distributed widely throughout United States 11
- 11** Dorsal abdominal triangles solid, without lines or dots passing through them 12
- 11'** Dorsal abdominal triangles not solid, with lines and/or dots passing through them 14
- 12** Dorsal abdominal triangles on A1-8 equal in size *ornithogalli*
- 12'** Dorsal abdominal triangles on A7 and A8 larger than the others 13
- 13** Larva found in Gulf States *ornithogalli* or *latifascia*
- 13'** Larva found northward of Gulf States *ornithogalli*
- 14** Pale markings through dorsal abdominal triangles form solid, or nearly solid, white or yellow line; subdorsal line white or yellow; side below subdorsal stripe usually with several fine longitudinal pin stripes; mesothoracic spot either triangular, elongate oval, or semicircular; widely distributed north of Mexico *ornithogalli*

14' Pale markings through dorsal triangles composed of series of large dots; subdorsal line white or orange; mesothoracic spot either semicircular or faintly trapezoidal, never triangular or elongate oval; mostly Gulf States *latifascia*