EENY216

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Yellowstriped Armyworm, *Spodoptera ornithogalli* (Guenee) (Insecta: Lepidoptera: Noctuidae)[1]

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Distribution

The yellowstriped armyworm, *Spodoptera ornithogalli* (Guenée), is common in the eastern United States as far west as the Rocky Mountains, and occurs in southern Canada. However, it also is reported from southwestern states, including California. The distribution of this native insect includes Mexico, Central and South America, and many Caribbean islands. As a pest, however, its occurrence is limited principally to the southeastern states. A very similar species, western yellowstriped armyworm, *Spodoptera praefica* (Grote), is known only from the western states, principally California and Oregon. In California, *S. praefica* is much more important than *S. ornithogalli*.

Life Cycle and Description

There apparently are three to four generations annually, with broods of adults present in March to May, May to June, July to August, and August to November. Some of the latter brood of yellowstriped overwinter as pupae rather than emerging as adults.

Figure 1. Lateral view of a larva of the yellowstriped armyworm, *Spodoptera ornithogalli* (Guenée). Credits: J. L. Capinera, University of Florida

Although eggs, larvae and adults of yellowstriped armyworm may be present in autumn or early winter they cannot withstand cold weather, and perish. Development time, from egg to adult, is about 40 days.

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Figure 2. Larva of the western yellowstriped armyworm, *Spodoptera praefica* Grote. Credits: Ken Gray, Oregon State University

Figure 3. Dorsal view of a larva of the yellowstriped armyworm, *Spodoptera ornithogalli* (Guenée). Credits: J. L. Capinera, University of Florida

Eggs

The eggs are greenish to pinkish brown in color and bear 45 to 58 small ridges. In shape, the egg is a slightly flattened sphere, measuring 0.46 to 0.52 mm in diameter and 0.38 to 0.40 mm in height. Females typically deposit clusters of 200 to 500 eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions. The eggs are covered with scales from the body of the adults. Duration of the egg stage is three to five days at warm temperatures.

Larvae

Larvae initially are gregarious in behavior, but as they mature they disperse, sometimes spinning strands of silk upon which they are blown by the wind. There usually are six instars, although seven instars have been reported. Head capsule widths are about 0.28, 0.45, 0.8-1.0, 1.4-1.6, 2.0- 2.2, and 2.8-3.0 mm, respectively, for instars one through 6. The larva grows from about 2.0 to 35 mm in length over the course of development. Coloration is variable, but mature larvae tend to bear a broad brownish band dorsally, with a faint white line at the center. More pronounced are black triangular markings along each side, with a distinct yellow or white line below. A dark line runs laterally through the area of the spiracles, and below this is a pink or orange band.

Dark subdorsal spots are found on the mesothorax of yellowstriped armyworm, and the triangular shape of these spots aids in distinguishing this insect from sweetpotato armyworm, *Spodoptera dolichos*, and velvet armyworm, *S. latifascia*, in eastern states. The head is brown but has extensive blackish markings. Duration of the larval stage is 14 to 20 days, with the first three instars requiring about two days each and the last three instars requiring about three days each.

Pupae

Larvae pupate in the soil within a cell containing a thin lining of silk. The reddish brown pupa measures about 18 mm in length. Duration of the pupal stage is nine to 22 days, normally averaging 12 to 18 days.

Adults

The moths measure 34 to 41 mm in wing span. The front wings are brownish gray with a complicated pattern of light and dark markings. Irregular whitish bands normally occur diagonally near the center of the wings, with additional white coloration distally near the margin. The hind wings are opalescent white, with a narrow brown margin. Under laboratory conditions average longevity of adults is 17 days, with most egg production completed by the tenth day (Adler et al. 1991).

The most complete description of *S. ornithogalli* and its biology is given by Crumb (1929), with additional comments by Crumb (1956). Keys for identification are also found in these references. Keys for separation of *Spodoptera* adults can be found in Todd and Poole (1980) and Heppner (1998) Larvae can be distinguished using the keys of Passoa (1991)

Figure 4. Adult yellowstriped armyworm, *Spodoptera ornithogalli* (Guenée). Credits: J. L. Capinera, University of Florida

and Heppner (1998). Rearing on artificial diet is described by Adler and Adler (1988).

Damage

Larvae damage plants principally by consumption of foliage. The small, gregarious larvae tend to skeletonize foliage but as the larvae grow and disperse they consume irregular patches of foliage or entire leaves. However, they will also feed on the fruits of tomato, cotton, and other plants. Larval consumption of soybean was estimated by King (1981) to total 115 sq cm; this is an intermediate value relative to some other lepidopterous defoliators.

Host Plants

These species are very general feeders, reportedly damaging many crops. Among vegetable crops injured are asparagus, bean, beet, cabbage, cantaloupe, carrot, corn, cucumber, lettuce, onion, pea, potato, rhubarb, rutabaga, salsify, sweet potato, tomato, turnip, and watermelon. Other crops damaged include alfalfa, blackberry, cotton, clover, grape, lentil, peach, rape, raspberry, sorghum, soybean, sugarbeet, sweetclover, sunflower, tobacco, wheat, and several flower crops. Some of the weed species known to be suitable hosts are castorbean, *Ricinus communis*; dock, *Rumex* sp.; gumweed, *Grindelia* sp.; horse nettle, *Solanum carolinense*; horseweed, *Erigeron canadensis*; jimsonweed, *Datura* sp.; lambsquarters, *Chenopodium album*; morningglory, *Ipomoea* sp.; plantain, *Plantago lanceolata*; prickly lettuce, *Lactuca scariola*; and redroot pigweed, *Amaranthus retroflexus*. In many cases, yellowstriped armyworm develops first on weed or rangeland plants, with subsequent generations affecting crops.

Natural Enemies

Several wasp parasitoids affect *S. ornithogalli*, including *Rogas laphygmae* Viereck, *R. terminalis* (Cresson), *Zele mellea* (Cresson), *Chelonus insularis* Cresson and *Apanteles griffini* Viereck (all Hymenoptera: Braconidae). Also, *Euplectrus plathypenae* Howard (Hymenoptera: Eulophidae) attacks larvae and causes a cessation of feeding within two days (Parkman and Shepard 1981). Thus, this parasitoid is particularly valuable at minimizing damage.

Numerous flies have been found to parasitize yellowstriped armyworm including *Archytas* spp., *Choeteprosopa hedemanni* Brauer and Bergenstamm, *Euphorocera omissa* (Reinhard), *E. tachinomoides* Townsend, *Lespesia aletiae* (Riley), *L. archippivora* (Riley), *Omotoma fumiferanae* (Tothill), *Winthemia quadripustulata* (Fabricius), and *W. rufopicta* (Bigot) (all Diptera: Tachinidae).

A nuclear polyhedrosis virus is highly pathogenic to larvae, and survivors that do not succumb exhibit reduced fecundity (Hostetter et al. 1990, Young 1990).

Undoubtedly predators are important, but their effect has not been quantified. In the related western yellowstriped armyworm. Bisabri-Ershadi and Ehler (1981) reported that over 96% of total mortality occurred in the egg and early larval stages, and most was attributed to predation. The most important predators were minute pirate bug, *Orius tristicolor* (White) (Hemiptera: Anthocoridae); bigeyed bugs, *Geocoris* spp. (Hemiptera: Lygaeidae); and damsel bugs, *Nabis* spp. (Hemiptera: Nabidae). The legume bug, *Lygus hesperus* Knight (Hemiptera: Miridae), was a facultative predator, often feeding on armyworm eggs. These, or similar, predators undoubtedly affect yellowstriped armyworm.

Management

Insecticides. Insecticides are applied to foliage to prevent injury by larvae. The microbial insecticide *Bacillus thuringiensis* can be applied to kill

Figure 5. Adult damsel bug, *Nabis* sp., a predator of the yellowstriped armyworm, *Spodoptera ornithogalli* (Guenée). Credits: Ken Gray, Oregon State University

armyworms, but should be applied when the larvae are young, as they become difficult to control as they mature. Larvae will consume bran bait containing insecticide.

For more information see the following:

Insect Management Guide for Field Crops

Insect Management Guide for Vegetables

Cultural Methods

Proximity of crops to rangeland containing weed hosts, or to alfalfa, may be important factors predisposing vegetable crops to injury. At high densities, especially if alfalfa hay is mowed, larvae will sometime disperse simultaneously and invade nearby vegetable fields. Physical barriers such as trenches can be used to deter such dispersal.

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