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# The Fall Armyworm – A Pest of Pasture and Hay.

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The fall armyworm, *Spodoptera frugiperda*, is a common pest of bermudagrass, sorghum, corn, wheat and rye grass and many other crops in north and central Texas. Larvae of fall armyworms are green, brown or black with white to yellowish lines running from head to tail. A distinct white line between the eyes forms an inverted “Y” pattern on the face. Four black spots aligned in a square on the top of the segment near the back end of the caterpillar are also characteristic. Armyworms are very small (less than 1/8 inch) at first, cause little plant damage and as a result often go unnoticed. Larvae feed for 2-3 weeks and full grown larvae are about 1 to 1 1/2 inches long. Given their immense appetite, great numbers, and marching ability, fall armyworms can damage entire fields or pastures in a few days.

Once the armyworm larva completes feeding, it tunnels into the soil to a depth of about an inch and enters the pupal stage. The armyworm moth emerges from the pupa in about ten days and repeats the life cycle. The fall armyworm moth has a wingspan of about 1 1/2 inches. The front pair of wings is dark gray with an irregular pattern of light and dark areas. Moths are active at night when they feed on nectar and deposit egg masses. A single female can deposit up to 2000 eggs and there are four to five generations per year. The fall armyworm apparently does not overwinter in north Texas, but survives the winter in south Texas. Populations increase in south Texas in early spring and successive generations move northward as the season progresses.

Parasitic wasps and flies, ground beetles, and insect viruses help suppress armyworm numbers. However, these natural enemies can be overwhelmed when large numbers of migrating moths move into an area and weather conditions favor high survival of eggs and larvae.

Management. Fall armyworm outbreaks in pastures and hay fields often occur following a rain which apparently creates favorable conditions for eggs and small larvae to survive in large numbers. Hay fields with a dense canopy and vigorous plant growth are often more susceptible to armyworm infestations than less intensely fertilized and managed fields. Irrigated fields are also susceptible to fall armyworm infestations, especially during drought conditions. Infestations that develop in volunteer wheat and weedy grasses in ditches and around fields can be a source of armyworms that can move into adjacent crops.

Look for fall armyworm larvae feeding in the crop canopy during the late evening and early morning and during cool, cloudy weather. During hot days, look for armyworms low in the canopy and on the soil surface where they hide under loose soil and fallen leaves. Kneeling on the ground and parting the grass can reveal armyworms. A sweep net is very effective for sampling hay fields for fall armyworms. When fields are wet with dew or rain, armyworms can

be detected by walking through the field with rubber boots as the worms will stick to the boots. Small larvae chew the green layer from the leaves, creating a “windowpane” effect and later notch the edges of leaves. Look for this feeding damage and if detected, look more closely to assess the infestation.

The key to managing fall armyworms is frequent inspection of fields to detect infestations before they have caused economic damage. Once larvae are more than ¾ inch long, the quantity of foliage they eat increases dramatically. During their final 2-3 days of feeding, armyworms eat 80% of the total foliage consumed during their entire development.

The density of armyworms sufficient to justify insecticide treatment depends on the stage of crop growth and value of the crop. Seedling plants can tolerate fewer armyworms than established plants. Infestations of more than 2-3 armyworms (1/2 inch or longer) per square foot may justify an insecticide application. If practical, apply insecticides early in the morning or late in the evening when armyworm larvae are most active and therefore most likely to come into contact with the insecticide spray.

If the field is near harvest, an early harvest, rather than an insecticide treatment, is an option. Once the field is cut, most of the armyworm will die due to lack of food and exposure to high temperatures. In some cases, armyworms can move into an adjacent field and continue to feed.

#### Insecticide Characteristics and Options.

The active ingredients beta-cyfluthrin, cyfluthrin, gamma-cyhalothrin, lambda-cyhalothrin and zeta-cypermethrin are all classified as pyrethroid insecticides and therefore have similar characteristics. Pyrethroids are nerve toxins. Due to their effectiveness and relatively low cost, they are widely used to control fall armyworm in pasture and hay. In many situations, a single treatment is sufficient to control an infestation. However, when fall armyworm populations are high, frequent retreatment with pyrethroids may be necessary due to their short residual control (2-3 days) and re-infestation of the field. Pyrethroid insecticides are effective against grasshoppers and suppress Bermudagrass stem maggot.

Dimilin and Intrepid are insect growth regulators and kill by disrupting the normal development of immature insects. To be effective, they must be applied when the armyworms are less than ½ inch long. This can be a limitation since infestations may not be found before larvae are larger. However, both products can continue to kill small caterpillars for 1-3 weeks. Thus, the addition of Dimilin or Intrepid to a pyrethroid insecticide application can extend the control period for fall armyworms. This combination can be especially useful when fall armyworm populations are high and fields are frequently re-infested. Dimilin and Intrepid can be used alone if applied as a preventive application and when caterpillars are less than ½ inch. Dimilin is also effective against small grasshoppers while Intrepid is active only against armyworms and other caterpillars.

Chlorantraniliprole, the active ingredient in Prevathon, is effective against all sizes of fall armyworms and grasshoppers. It provides several weeks of residual control, depending upon rate applied and is a general use pesticide. Besiege is a combination of the active ingredient in Prevathon and a pyrethroid insecticide.

Malathion and carbaryl have a long history of use for armyworm and grasshopper control and are general use insecticides. Carbaryl has a 2-week waiting period after application before the crop can be grazed or harvested.

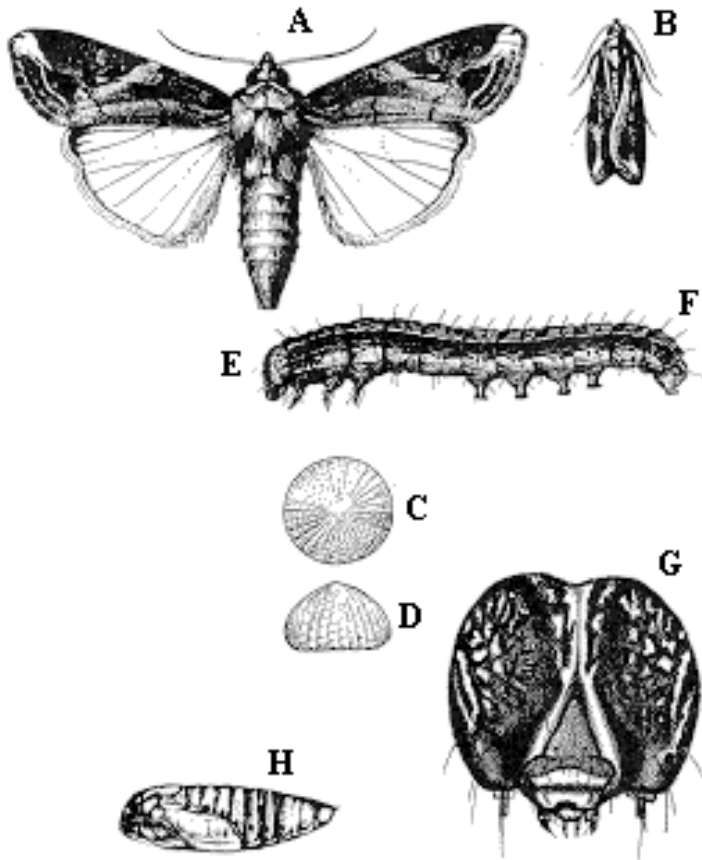
Spinosad is most effective on small larvae. One formulation of spinosad, Entrust, is approved for organic production by the Organic Materials Review Institute.

A nuclear polyhedrosis virus found in nature that kills fall armyworm has been cultured and formulated into an insecticide and is commercially available under the name Fawligen (AgBiTech LLC, Ft. Worth, TX). It is toxic only to larvae of the fall armyworm and beet armyworm. It is labeled for hay production and pasture, but studies are needed to determine best use practices and efficacy under field conditions in the US.

Always read and follow all label instructions on pesticide use and restrictions. Information below is provided for educational purposes only.

**Some Insecticides labeled for fall armyworm in pasture, grasses, and hay. 2019.**

<b>Active ingredient</b>	<b>Insecticide</b>	<b>Pre-grazing interval (days)</b>	<b>Pre-harvest interval for hay (days)</b>	<b>Remarks</b>
beta-cyfluthrin	Baythroid	0	0	Restricted use
carbaryl	Sevin 4F, Sevin 80S, Carbaryl 4L, Sevin XLR Plus	14	14	General use
chlorantraniliprole	Prevathon, Coragen	0	0	General use
chlorantraniliprole + lambda-cyhalothrin	Besiege	0	7	Restricted use
cyfluthrin	Tombstone	0	0	Restricted use
diflubenzuron	Dimilin 2L	None listed	1	Restricted use; apply at egg hatch and when larvae are less than ½ inch
gamma-cyhalothrin	Declare	0	7	Restricted use
lambda-cyhalothrin	Warrior II, Karate, Lambda-Cy	0	7 for hay, 0 for forage	Restricted use
malathion	Malathion 57EC	0	0	General use
methoxyfenozide	Intrepid 2F	0	7	General use. Apply when first signs of feeding occur
spinosad	Tracer, Blackhawk, Entrust	Allow spray to dry	3 days, 0 days for forage	General use; target small larvae or egg hatch
zeta-cypermethrin	Mustang Maxx	Allow spray to dry	0	Restricted use



**Fall armyworm. A & B, Adults. C- E, Eggs (enlarged) and egg mass. F & G, Larva with front view of head. H, Pupa.**