

Should I consider a late-season insecticide application?

Determining if a late-season insecticide application is warranted is difficult for any crop. Integrated Pest Management (IPM) principles help determine if an insecticide application can protect the crop from economic injury associated with insect feeding.

What are IPM principles?

IPM principles:¹

- Support the use of cultural means, biological products, natural occurring predators, and resistant crop products to help manage pest populations before the use of chemical controls.
- Field scouting to determine the presence and abundance of an insect pest(s).
- Determining the pest population based on established calculation procedures.
- Review of established pest economic thresholds and economic injury levels.
- Observing the presence and population of beneficial insects or other natural occurring biological organisms (fungi, viruses) that help control pests.
- Determination of the insect larval stage of growth (mature larvae may be near end of life and feeding).
- Stage of crop growth.
- Determination of the potential loss of yield or grain quality based on economic thresholds.
- Cost to apply an insecticide (insecticide, labor, equipment).
- Consideration for the next crop to be planted (same or different).
- If an insecticide is applied, will the pest be accessible by the active ingredient? Insects located deep in corn whorl or plant stems may not ingest or absorb the insecticide.
- Will the use of an insecticide give rise to another pest that beneficial insects, fungi, and viruses are controlling?
- Though present, does the pest normally cause economic loss?
- Helping to reduce the environmental impact of unwarranted pesticide use.

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Where can insect thresholds be found?

Agricultural universities have established thresholds for many of the insect pests found within their respective states. Additionally, agronomists and seed representatives can provide insect management information.

What is the difference between economic injury level and economic threshold?

An economic injury level (EIL) is the point where losses of the crop incurred by a pest begin to exceed the costs of insecticide applications (this includes application and insecticide costs). The economic threshold (ET) is lower population threshold of the pest where intervention by insecticides or other means will prevent the population from exceeding the EIL.² This ET is determined by experimental work and is usually available from local universities and other sources.

What is the difference between systemic, contact, or translaminar insecticides?³

The nature of an insecticide dictates how insects may be controlled. Insects feeding within a stalk, stem, or seed are usually protected from insecticides applied only to the plant's surface tissues.

Contact insecticides help provide protection to plant tissues that the insecticide contacts. Insects must ingest the protected tissue to receive a lethal dose. New tissue that emerges after application is not protected and can be fed upon without ingesting the insecticide. Most foliar insecticides are contact in nature.

Translaminar insecticides move into the leaf at the point of contact creating a reservoir of active ingredient that helps provide protection for a longer period. In contrast to systemic materials, translaminar materials only move a short distance, not throughout the plant.

Systemic insecticides are absorbed and move within the plant; however, movement may be slow to reach new shoot growth before insect damage occurs. Additionally, systemic insecticides tend to move upward in a plant from the point of application contact with the plant. Insects feeding below the point of contact may not ingest a lethal dose. A few systemic insecticides can move both directions throughout the plant.

What late-season corn insects may warrant an insecticide application?

Japanese beetle, western corn rootworm beetle, corn earworm, fall armyworm, corn leaf aphids, spider mites, and western bean cutworm are the dominant insects that may warrant an insecticide application to help reduce the potential for economic plant damage and/or help maintain grain quality.

If non-Bt (*Bacillus thuringiensis*) protected corn is being injured by corn earworm and western bean cutworm, should corn products with Bt protection for corn earworm and western bean cutworm be treated with a precautionary insecticide?

Corn products with *Bt* protection for corn earworm and western bean cutworm, including products with Trecepta® Technology, help provide excellent protection against the feeding of these insects. However, *Bt* protected fields should be scouted along with non-*Bt* protected fields.

A systemic insecticide may be considered for non-*Bt* corn products that have reached economic thresholds of injury.

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What late-season soybean insects may warrant an insecticide application?

Bean leaf beetles, Japanese beetles, spider mites, soybean aphids, stink bugs, grasshoppers, soybean podworm, velvetbean caterpillars, green cloverworms, soybean loopers, and cabbage loopers are the dominant insects (adults, larvae, nymphs) that may warrant an insecticide application to help reduce the potential for economic plant damage and/or help maintain soybean seed quality.

What late-season cotton insects may warrant an insecticide application?

Bollworm, tobacco budworm, cotton aphids, cowpea aphids, green peach aphids, stink bugs, Verde plant bug, and beet armyworms are the dominant insects (adults, larvae, nymphs) that may warrant an insecticide application to help reduce the potential for economic plant damage and/or help maintain cotton boll quality.⁴

Can planting date affect the amount of injury to crops?

Yes. For late-planted crops, the plant's growth stage may be more vulnerable to injury when the pest's population reaches its peak. As an example, a late-planted corn field that silks after nearby fields could draw rootworm beetles from the nearby fields. The sheer number of beetles could cause extensive silk feeding and result in poorly filled ears. Additionally, if corn is planned for the field the following year the potential for rootworm larval feeding the next year may increase because of the amount of eggs laid by the adults the previous year.

Should an insecticide be applied when foliar feeding is observed?

Most crops can sustain considerable foliar feeding before economic injury levels are reached. Leaf feeding can appear to be much worse than the actual percentage of lost tissue. Scouting should continue to determine the extent of feeding based on foliar feeding diagrams and threshold information.

Can an insecticide-fungicide tank-mix be used to reduce application costs?

Though the two pesticides may be compatible as a tank mix (pesticide labels must be reviewed for compatibility), optimum application timing for each pesticide is critical to maximize the efficacy of each pesticide. Additionally, insecticides should be applied when the economic threshold for an insect has been reached. A precautionary application can reduce profit, kill beneficial insects needlessly, increase the potential for the development of insecticide resistance, and potentially increase unneeded environmental exposure.

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How do I determine return on insecticide investment (ROI)?

Annual financial planning should include a realistic potential yield expectation for each crop and a realistic market price. If the crop has a contract price/bu, then the dollar amount/bu is somewhat firm. In the absence of a contract, the market price may need to be adjusted accordingly during the growing season based on the current market. The expected production and monetary benefit become the basis for ROI calculations. From the basis, the anticipated loss of yield or grain dockage with and without insecticide treatments should be subtracted from the basis along with the cost of an insecticide application. The ROI for the use of an insecticide should be greater than without the use. Any change in projected yield, market price, and cost of an insecticide application can change the potential ROI from positive to negative to breakeven. A common rule of thumb is that as the commodity price increases, your economic thresholds will decrease.


Sources:

- 1 2011. Integrated pest management (IPM) tactics. PennState Extension. The Pennsylvania State University. <https://extension.psu.edu/integrated-pest-management-ipm-tactics>.
- 2 Reisig, D. 2017. Insect management. AG-835. NC State Extension Publications. North Carolina State University. <https://content.ces.ncsu.edu/north-carolina-soybean-production-guide/soybean-insect-management>.
- 3 Krauskopf, D.M. 2007. Contact, systemic and translaminar: How insecticides move in plants. MSU Extension. Michigan State University. https://www.canr.msu.edu/news/contact_systemic_and_translaminar_how_insecticides_move_in_plants.
- 4 Mid-season and late-season pests (cotton). Extension Entomology. Texas A&M University. <https://extensionentomology.tamu.edu/resources/management-guides/managing-cotton-insects-in-texas/mid-season-and-late-season-pests/>.

Other Sources:

Heiniger, R. 2018. Management for late planted corn. NC State Extension. North Carolina State University. <https://corn.ces.ncsu.edu/corn-production-information/management-for-late-planted-corn/>.

Websites verified 7/15/21.



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