

Pesticide Applicators, Integrated Pest Management, and Pesticide Safety in Connecticut

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- All licensed Connecticut pesticide applicators are trained, certified, and recertified professionals; they keep records and report annual pesticide use – all required by law.
- In Connecticut, restricted-use pesticides on farms require private applicator certification, and commercial pesticide work requires commercial certification under Department of Energy & Environmental Protection (DEEP) oversight.
- Integrated Pest Management (IPM) reduces risks by improving pest identification, monitoring, thresholds, prevention, product selection, and timing, often reducing unnecessary pesticide use and the number of applications needed.
- “Organic,” “natural,” and “conventional” are not safety categories by themselves. Products should be evaluated case by case for toxicity, exposure potential, environmental impact, effectiveness, and cost.
- LD50 is useful, but it reflects acute toxicity only. Safe decisions also depend on exposure, label directions, chronic effects, environmental conditions, and the person exposed.

This article explains what licensed pesticide applicators in Connecticut are required to do, why that matters for public safety, and how IPM complements licensing processes by reducing risk before, during, and after pesticide applications.

KEY DEFINITIONS

- **Pesticide:** A broad term that includes products used to manage pests, such as insecticides, herbicides, fungicides, rodenticides, and disinfectants.
- **Restricted-use pesticide (RUP):** A pesticide that EPA has determined is not available for purchase or use by the general public because, without additional restrictions, it may cause unreasonable adverse effects to the environment or injury to applicators or bystanders. RUPs may only be used by a certified applicator or someone under that applicator’s direct supervision.
- **Private applicator:** In Connecticut, a farmer who obtains certification to purchase and use restricted-use pesticides on agricultural crops on their own farm, rented land, or certain other farms when not being paid for commercial application services.
- **Commercial supervisor:** In Connecticut, the certified applicator responsible for deciding whether pesticides are used, which product is used, dosage, timing, method, and precautions in commercial application settings.



READ IT ONLINE

- **Integrated Pest Management (IPM):** A holistic decision-making process that uses prevention, monitoring, accurate diagnosis, damage thresholds, and a mix of cultural, biological, mechanical, and chemical tactics to manage pests safely and economically.
- **Toxicity:** A substance's inherent ability to cause harm.
- **Risk:** The likelihood of harm under real-world conditions. In pesticide science, risk depends on both toxicity and exposure.
- **LD50:** A standard measure of acute toxicity, the single dose expected to kill 50% of a test population under specified conditions. Lower LD50 values indicate higher acute toxicity.
- **Signal word:** A word required on pesticide labels to reflect acute toxicity category, such as CAUTION, WARNING, or DANGER/POISON.

WHAT A LICENSED PESTICIDE APPLICATOR IN CONNECTICUT IS REQUIRED TO DO

A licensed applicator in Connecticut is operating inside a structured state and federal system, not just purchasing a product and applying it however they want. The state uses different certification pathways depending on who is applying the pesticide and under what circumstances. These different pathways are explained below.

1) Private applicators (farmers using restricted-use pesticides)

- A farmer who wishes to use restricted-use pesticides must obtain a private applicator certificate.
- The private applicator exam is based on the core manual plus Worker Protection Standard (WPS) materials, including pollinator protection material, and Connecticut statutes and regulations.
- As a minimum requirement, the applicator must demonstrate practical knowledge of pesticide laws and the pest problems associated with the farming operation, including the ability to recognize pests and damage before choosing a control tactic.
- Private applicators must maintain records of each use of restricted-use pesticides and file an annual report with DEEP by January 31 for the previous year's applications.
- For renewal, DEEP currently requires 12 continuing-education credits per renewal period, and prior annual reports among other requirements.

2) Commercial supervisors

- Commercial supervisory certification is required for applicators who decide whether pesticides will be used, which product will be selected, where and when it will be used, at what dosage, and with what precautions.
- Supervisors may purchase restricted-use pesticides in the category or categories for which they are certified.
- Every company applying pesticides commercially must have a certified supervisory applicator. That supervisor must either be present during the application or provide specific written instructions to the certified operator.
- Most supervisory categories require both a written exam and an oral exam. DEEP states that written exams require at least a 75% score to pass, and most oral exams last about 20 to 30 minutes and are conducted by 2 to 4 board members, who ask category-relevant questions that may include pest identification, regulations, and pesticide selection.

- Supervisors are required to renew their licenses every five years. DEEP currently requires 12 continuing-education credits per certification category, all required use summaries, and the renewal fee.

3) Commercial junior operators

- Commercial junior operators actively use pesticides in a non-supervisory role and must work under the direction of a certified supervisor.
- Junior operator exam has 60 multiple-choice questions and requires at least an 80% score to pass.
- This distinction matters in public communication because not everyone applying a pesticide in commercial scale is making the supervisory decision; the Connecticut system separates supervisory and operational roles.

4) Record keeping and reporting are already part of the job

- Commercial applicators are required to maintain records and submit an annual Commercial Applicator Pesticide Use Summary Report electronically to DEEP.
- The current commercial use-summary form requires the certified supervisor's information, the reporting period, product names, EPA registration numbers, and total amount of product used before diluting.
- The current commercial use-summary form instructs the applicator to retain a copy for at least 5 years and to submit it by January 31 for applications made during the preceding calendar year.
- DEEP may deny license renewal if required reports are not submitted.

WHY LICENSURE MATTERS FOR PUBLIC SAFETY

Licensure does not mean pesticides are risk-free. It does mean that Connecticut has chosen to require training, testing, continuing education, and accountability for people who use restricted-use products or who make pesticide decisions for others. That distinction is important when comparing a licensed applicator with an occasional purchaser of a general-use consumer product.

- Licensed applicators are required to understand label directions, personal protective equipment, mixing and loading, storage, disposal, drift prevention, environmental precautions, and legal restrictions.
- EPA emphasizes that the pesticide label is legally enforceable: "the label is the law." Using a pesticide in a manner inconsistent with its labeling is a violation of federal law and can result in enforcement actions, including warnings, civil penalties, criminal penalties for knowing violations, and, in Connecticut, denial, suspension, or revocation of applicator certification.
- EPA classifies some products as restricted-use specifically because they can harm people or the environment without added restrictions; those products are NOT available to the general public.
- EPA also works in partnership with state land-grant university pesticide safety education programs, including UConn Extension's program, as part of the training infrastructure for certified applicators.

HOW IPM HELPS REDUCE RISK

Licensing and IPM are not alternatives; they work best together. Licensure helps ensure that pesticide users know how to handle products lawfully and safely. IPM improves the decision-making process before and during pesticide use, which can reduce the number of times pesticides are used and the chance that the wrong product, rate, or timing will be chosen.

- Accurate identification: IPM starts with identifying the actual pest or problem before choosing a response. Misdiagnosis can lead to unnecessary or incorrect applications.
- Monitoring and thresholds: IPM uses trapping and scouting so that treatment occurs only when pests are present and in excess of economic thresholds.
- Prevention: crop rotation, sanitation, resistant varieties, habitat management, site selection, and cultural practices can reduce pest pressure before pesticides are even considered.
- Product selection: When a pesticide is needed, IPM recommends choosing selective or biorational products when possible. Selective products can reduce impacts on beneficial organisms, lower the risk of secondary pest outbreaks, improve farm safety, and reduce the number of applications needed.
- Resistance management: IPM helps applicators reduce the risk of developing pesticide-resistance on their properties by rotating modes of action and avoiding repeated, unnecessary use of the same chemistry.
- Risk reduction: EPA notes that preventive pesticide applications should be limited when exposure risks outweigh the benefits and when nonchemical options can provide the same result.

WHAT THE PUBLIC OFTEN MISSES ABOUT PESTICIDE REVIEW AND LABELS

Before a pesticide product can be sold in the United States, EPA reviews scientific data on the product and its proposed uses. EPA's review is not just about whether a substance can kill a pest; it is also about whether the product can meet the legal safety standard for human health and the environment under specific conditions of use.

- EPA's pesticide registration process examines the ingredients, the crop or site where the pesticide will be used, the amount, frequency, and timing of use, and storage and disposal practices.
- EPA's human health risk assessment evaluates hazard identification, dose-response, exposure, and risk characterization.
- EPA states plainly that risk depends on both toxicity and exposure. In its simplified formulation, $\text{risk} = \text{toxicity} \times \text{exposure}$.
- If EPA finds that risks need to be reduced, it can make/suggest requiring changes in how and where a pesticide is used. If a pesticide cannot meet the safety standard after appropriate mitigation, EPA will not allow the use.

WHY LABELS MATTER

- The label contains legally enforceable directions and precautions.

- Labels communicate route-specific hazards, signal words, required PPE, restricted-entry intervals when applicable, first aid, environmental hazards, storage and disposal, and use directions.
- A label is a legal and scientific document that translates EPA's review into practical use directions.

ORGANIC, NATURAL, AND CONVENTIONAL: COMMON MISUNDERSTANDINGS

A frequent public misunderstanding is that “organic” automatically means “safe” and “synthetic” automatically means “dangerous.” That is not scientifically accurate. Safety is not determined by whether a product is natural or synthetic alone.

- Some organic treatments may be less damaging to the environment than some conventional insecticides, but they are still pesticides and should be evaluated for toxicity, environmental impact, effectiveness, and cost.
- Repeated applications of an organic product may end up costing more and affecting non-targeted populations more than a single dose of a conventional product.
- Homemade or “natural” pesticide recipes may have untested efficacy, toxicity, and environmental effects.
- EPA defines biopesticides as pesticides derived from natural materials, microorganisms, or certain pesticidal substances produced by plants; “natural” status does not remove the need for registration, evaluation, or careful use.
- Often, organic, natural, biorational or similar materials are much less effective than their conventional or synthetic counterparts – posing a significant challenge for long-term farm viability and food security.

WHAT IS LD50

- LD50 is a measure of acute toxicity from a single dose under specified conditions. Lower LD50 values mean higher acute toxicity.
- Signal words such as CAUTION, WARNING, and DANGER/POISON are linked to acute toxicity categories and other acute tests.
- LD50 does not capture the whole safety picture. It does not by itself describe chronic toxicity, endocrine or developmental concerns, carcinogenic potential, ecological effects, drift potential, persistence, or real-world exposure conditions.
- A product may have relatively low acute toxicity yet still require careful management because exposure can still create risk. Conversely, a more acutely toxic product may present lower real-world risk if exposure is tightly controlled and the label is followed. This is why risk, not toxicity alone, is the central concept.

CONCLUSIONS

Not every pesticide application is automatically harmless, nor should public concerns be dismissed. Professional pesticide use in Connecticut is essential and occurs within a system of training, testing, legal oversight, continuing education, and reporting that is far more rigorous than many people realize.

- Licensed applicators are among the best-trained pesticide users in the state because they are trained specifically in pesticide law, safety, application, and stewardship.
- That training matters most when it is paired with IPM, which reduces unnecessary applications and supports better choices when a pesticide is needed.
- The goal should be fewer unnecessary applications, better-targeted applications, and safer lawful applications by the people who understand both pest biology and pesticide stewardship.

Declaration of Generative AI and AI-assisted technologies

During the preparation of this article the authors used ChatGPT in order to generate initial outlines and draft sections. After using this tool, the authors reviewed and edited the content to ensure accuracy and clarity and take full responsibility for the content of this publication.



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