

STATE OF CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION



INFORMATION FOR APPLICANTS

MOSQUITO AND BITING FLY PEST CONTROL LICENSE

An applicant for a mosquito and biting fly pest control license is expected to possess a working knowledge of the operations performed by a pest control operator and the reasons for performing them. Outlined below are areas in which an applicant should be proficient.

DIAGNOSIS

Diagnosis is of primary importance and an applicant should:

- (a) Be able to identify a variety of mosquitoes and biting flies found in the region to include:

Mosquitoes

Biting Flies

Aedes
Culex
Culiseta
Mansonia (Coquillettidia)
Psorophora
Uranotaenia
Wyeomia
Anopheles

Black Flies
Deer Flies
Midges

- (b) Know the biology and habits of the species listed
- (c) Recognize evidence of infestation
- (d) Be aware of conditions, which favor infestation
- (e) Recognize harborages, which favor infestation
- (f) Diseases spread by mosquitoes and also which species vector which diseases.

TREATMENT

Having determined the needs of a given situation, the applicant should be able to prescribe and apply the proper treatment. This requires knowledge of:

- (a) Whether or not pesticides are to be applied
- (b) The pesticides used, their properties, such as effectiveness against the pests and their toxicity to man and other warm-blooded animals. These pesticides should include, but not be limited to:

B.T. i (Bacillus Thuringiensis var. israelensis)
B.S. (Bacillus spaericus)
cyfluthrin
methoprene(Altosid)
permethrin
malathion

Resmethrin
Sumithrin
Methoxychlor
Agnique MMF
pyrethrum(synergized)
carbaryl (Sevin)

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- (c) The dosages and timing involved
- (d) How the pesticides are to be mixed
- (e) The calibration of equipment
- (f) Methods of application and various types of equipment
- (g) The proper storage and transportation of pesticides
- (h) State and Federal pesticide laws and regulations

OPERATIONAL PRACTICE

The applicant should know:

- (a) Basic safety and handling rules for pesticide use
- (b) How and when to use common types of protective equipment
- (c) Early signs and symptoms of pesticide poisonings
- (d) First aid which can be used in the event of pesticide poisonings
- (e) Precautions to be taken to protect workers, the public, and the environment
- (f) The proper disposal of pesticide containers and surplus pesticides

REFERENCE MATERIAL

"Pesticide Applicator Training Manual – Core Manual"

Available from: Local County Extension Offices
 Or by writing to: Publication Resource Center
 Rm. 2, W.B. Young Bldg.
 1376 Storrs Road
 Storrs, CT 06269
 Tel: 860-486-3336

"Pesticide Applicator Training Manual"

Aquatic Pest Control, Category 5, Chapters IV and VII
 Pesticide Manuals
 Resource Center
 7-B Business & Technology Park
 Ithaca, NY 14850
 Tel: 607-255-2080
 Fax: 607-255-9946

"Scientific Guide to Pest Control Operations"

Continuing Education Business Office
 Stewart Center, Room 110
 Purdue University
 West Lafayette, IN 47907

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For The Most Up To Date Mosquito Information Call Toll Free 1-866-WNV-LINE (1-866-968-5463)



The State of Connecticut Mosquito Management Program is a collaborative effort involving the Department of Environmental Protection, the Connecticut Agricultural Experiment Station, the Department of Public Health, the Department of Agriculture, and the University of Connecticut Department of Pathobiology and Veterinary Science.

These agencies are responsible for monitoring and managing the state's mosquito population levels to reduce the potential public health threat of mosquito-borne diseases. [Learn More](#)

Latest Mosquito Testing Results

Public Service Announcements

Personal Precautions
(30 seconds)



[personal.wmv](#)
(1.4 mb)
[Transcript](#)

Homeowner Precautions
(30 seconds)

Spraying Precautions
(60 seconds)



[spraying.wmv](#)
(2.5 mb)
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Connecticut Mosquito Management Program
c/o DEP
Franklin Wildlife Management Area
391 Route 32
North Franklin, CT 06242

Phone:
(860) 642-7630

For the latest information on test results, spray locations and protective measures, call toll free 1-866-WNV-LINE (866-968-5463)

AQUATIC PERMIT APPLICATION LINKS

www.ct.gov/deep/lib/deep/Permits_and_Licenses/Waste_Permits/aquatic_app.pdf

www.ct.gov/deep/lib/deep/Permits_and_Licenses/Waste_Permits/aquatic_inst.pdf

http://www.ct.gov/deep/lib/deep/Endangered_Species/general_information/nddb_app.pdf

http://www.ct.gov/deep/lib/deep/Endangered_Species/general_information/nddb_inst.pdf

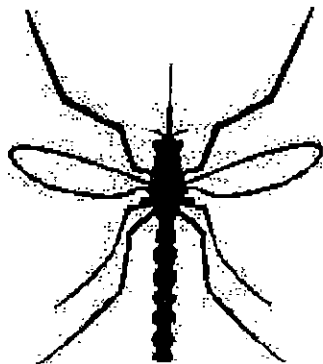
www.ct.gov/deep/lib/deep/Permits_and_Licenses/Common_Forms/compliance_form.pdf

http://www.ct.gov/deep/lib/deep/Permits_and_Licenses/Common_Forms/coastal_review_app.pdf

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Mosquito Fact Sheet



How many species of mosquitoes are there? There are currently 46 species identified in Connecticut, 150 in North America and over 3000 species worldwide.

Do all mosquitoes bite humans? No. Of the 46 species in Connecticut, only 12 are considered pest species to humans and livestock.

Why do mosquitoes bite humans? Mosquitoes do not actually "bite" humans; they "feed" on them. Female mosquitoes require protein to produce their eggs and obtain this protein from the blood of humans and other

animals.

Do male and female mosquitoes both feed on humans? No. Since male mosquitoes do not lay eggs, they do not require protein. Only the female mosquito requires a source of protein to produce her eggs.

Where do mosquitoes breed? A mosquito's lifecycle has four stages – egg, larva, pupa, and adult. Mosquitoes need water to breed since all mosquitoes spend their larval and pupal stages in water. Therefore, mosquitoes can always be found around water.

This is why it is important to prevent stagnant water from standing around your home and apply a larvacide to areas where stagnant water cannot be removed.

How long do mosquitoes live? Most adult mosquitoes wind up as food for birds, dragonflies, or spiders. Others succumb to the effects of wind, rain, and drought. Those that don't may persist for as long as 2-3 months and adults that hibernate can live as long 6-8 months.

Where do mosquitoes go during the winter? Mosquitoes are cold-blooded creatures and do not generally bite in temperatures below 50F. In Connecticut, some adult mosquitoes become inactive with the onset of cold weather and enter into hibernation before the first frost. Other mosquitoes die in the fall but have winter-hardy eggs, which hibernate as embryos.

How do mosquitoes spread disease? Only in the last century has it been known that mosquitoes are capable of spreading disease. The diseases are often viruses that are picked up by the mosquito when it feeds on an infected host. When the mosquito then feeds on another host, it can then spread the virus.

What type of diseases can mosquitoes carry? Mosquitoes are known to have carried diseases such as malaria, yellow fever, dog heartworm, and viral encephalitis. Mosquitoes do not transmit AIDS.

How can mosquitoes be controlled? Mosquitoes around the home can be reduced significantly by minimizing the amount of standing water available for mosquito breeding. Sources of mosquito breeding can be:

- Tin cans
- Discarded tires
- Trash cans
- Bird baths and wading pools
- Clogged roof gutters
- Poorly maintained swimming pools –(Apply a larvacide to areas of stagnant water that cannot be removed.)

Connecticut has also implemented an aggressive mosquito control strategy including mosquito testing, habitat modification, and ground-spraying with mosquito-killing pesticides when disease-carrying mosquitoes are isolated.

Why are mosquitoes able to survive pesticide spraying? Pesticides such as resmethrin are designed to kill adult mosquitoes within 5-30 minutes of contact. Contact is more reliably achieved after sunset and overnight when most mosquitoes are airborne. When contact is made, insecticides such as resmethrin are approximately 90% effective so some mosquitoes do survive spraying. It is not designed to kill mosquito larvae so non-adult mosquitoes will not be affected and new hatches of adults may need to be addressed.

How can I protect myself from mosquito-borne diseases? The best way is to avoid being bitten by mosquitoes. This can be accomplished using personal protection while outdoors when mosquitoes are present. Examples of such protective measures are:

- Wear long-sleeved shirts and pants when outdoors
- Use insect repellent containing DEET (Caution: Always follow the directions on any insect repellent. *NEVER* use repellent containing DEET on infants.)
- Cover baby carriages and playpens with mosquito netting if outdoors while mosquitoes are present.

Where can I go for more information?

DEP's Mosquito Information Line at (860) 424-4184 (Recorded Message)
DEP's Mosquito Management Program at (860) 642-7239
Visit DEP's Website (*Environmental and Health Updates*) at <http://dep.state.ct.us>

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AMERICAN CROW FACT SHEET



How can I identify an American Crow? American crows are large, black, perching birds with robust beaks and a fan-shaped tail. Both sexes are similar in appearance although females are slightly smaller.

How widely dispersed are American Crows? American crows are found throughout central and eastern North America, wintering as far north as southern Maine and the Great Lakes region.

What is the history of the American Crow in Connecticut? American Crows are native to Connecticut. Crow populations have been increasing in Connecticut since the early 1800s due to their ability to adapt to human behavior, high reproductive potential, and opportunistic feeding habits.

When do crows mate? Early spring (March) is when crows usually court and mate. After mating, females build a nest in 5 to 13 days against the trunk of a tree at heights ranging from 6 to 60 feet above the ground.

How long do crows live? In the wild, the average life span is 7-8 years. In captivity, crows have been known to live up to thirty years.

Do crows migrate? American crows can be considered partially migratory. They can make rather long daily movements but do not need to migrate for long distances. Crows will migrate out of areas with winter temperature averages of approximately 0F. In more temperate winter climates like Connecticut, most crows remain all winter.

How far can crows travel during a day? As noted above, crows can travel rather long daily distances. Daily distances of upward to 50 miles are common and distances upward to 100 miles have been documented.

Why do crows congregate (roost) in large numbers? For crows, large roosts are primarily a fall and winter phenomenon. Numbers peak in winter then decrease as the breeding season approaches in March. It appears all crows join in winter roosts, even territorial breeding crows. Most theories suggest crows roost because it provides protection from predators and they don't mind congregating in large numbers as some birds do.

What is the connection between the West Nile-like virus (WNV) and crows? Several dead crows in Connecticut and New York have tested positive for WNV in recent weeks. Although it is not conclusive they died from WNV, necropsies performed on the birds have failed to show another cause of death.

Why are crows dying from (WNV)? This is not yet completely understood. Birds where WNV is more common do not usually show any symptoms when infected with WNV. Because this is a disease

never before encountered by birds in North America, the birds have not had an opportunity to build up natural defenses. Further studies are necessary before this question can be answered conclusively.

Are crows spreading the disease to humans? No. Crows cannot transmit this disease to humans. They must first be bitten by an infected mosquito that must then bite a human in order to *possibly* spread the disease. Even then

most humans will not show the effect of the disease.

What should I do if I find a dead crow? The DEP and the Department of Public Health are advising residents who find dead crows or other birds to report this to their local health department. The local health department then may send a representative to pick up the bird or request you dispose of the bird in an appropriate manner.

What if I am told to dispose of the bird myself? Dead birds can be disposed of by burying (three-foot deep) or double-bagging them and disposing of them with regular trash. Check with your local health department for specific instructions.

Where can I go for more information?

- DEP's Nonharvested Wildlife Program at (860) 675-8130
- Department of Public Health Office of Epidemiology at (860) 509-7994.
- Visit DEP's Website (*Environmental and Health Updates*) at <http://dep.state.ct.us>

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Connecticut Department of Public Health

FACT SHEET -- Eastern Equine Encephalitis

What is Eastern Equine Encephalitis?

Eastern Equine Encephalitis (EEE) is a rare but serious disease caused by a virus.

What are the symptoms of EEE?

The first symptoms of EEE are high fever (103 - 106 F), stiff neck, headache and lack of energy. Swelling of the brain, called encephalitis, is the most dangerous symptom. The disease gets worse quickly and some patients go into a coma within a week.

How soon would symptoms appear?

Symptoms can appear anywhere from 3 to 10 days after being bitten by an infected mosquito.

What is the treatment for EEE?

Once symptoms develop, there is no effective treatment for EEE and as many as 5 of every 10 people who get the disease die from it.

How common are human cases of EEE in the United States?

In the United States between 1964 and 1996, 153 human cases of EEE were reported, with fewer than 10 cases in most years. These cases were all reported from eastern states, with most of the cases being reported from Florida (47 cases), Georgia (19 cases), Massachusetts (19 cases), and New Jersey (17 cases).

Have there been any human cases of EEE in Connecticut?

There has never been a documented human case of EEE in Connecticut.

Have there been any horse cases of EEE in Connecticut?

EEE is believed to have occurred among horses in Connecticut as far back as 1928 when there was a severe outbreak in New London County with about 100 cases. The last confirmed horse case occurred in Willington in the fall of 1991. In the fall of 1990, four horses died from EEE, one each in Canterbury, Haddam, Salem, and Waterford.

How is EEE spread?

EEE is spread only by mosquitoes. The virus grows in birds that live in freshwater swamps and is generally found only in these birds and in mosquitoes that do not bite people. In some years, many birds get infected and other types of mosquitoes pick up the virus that also bite people and horses. The risk of getting EEE is highest from late July through September. The virus is spread by adult mosquitoes, which are killed by frost in the fall. The virus cannot be spread by people and horses with the disease.

Can any mosquito spread EEE to people?

In Connecticut, there are 45 different mosquito species. Most of these mosquito species have not been found to carry EEE, and only four species have been linked to human outbreaks of EEE that have occurred in other states.

How is testing done for EEE in mosquitoes?

Mosquitoes are collected alive in light traps placed at sites in the afternoon. The next day, the traps are collected and the mosquitoes hand sorted by species at the Connecticut Agricultural Experiment Station. They are sent to the Yale Arbovirus Research Unit for testing. After further preparation, mosquito samples are put onto cell cultures. Positive test results are reported as soon as they are identified. If no virus is identified, the results are reported as negative after 7 days.

What can you do to protect yourself?

The only way to protect yourself is to keep mosquitoes from biting you.

- If you must be outdoors at dawn and dusk when mosquitoes are most active, wear long-sleeved shirts and long pants. Use mosquito repellent that contains DEET and follow the directions on the label.
- Take special care to cover up the arms and legs of children playing outdoors near swampy areas. When you bring a baby outdoors, cover the playpen or carriage with mosquito netting.
- Fix any holes in your screens and make sure they are tightly attached to all doors and windows.
- Mosquitoes can breed in water that collects in ditches, clogged gutters, old tires, wheelbarrows and wading pools. Don't let stagnant water collect around your home.
- Don't camp overnight near freshwater swamps. When camping outdoors in tents in other areas, make sure that your tent is equipped with mosquito netting.

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PESTICIDES AVAILABLE FOR MOSQUITO CONTROL

IMPORTANT – ALL PESTICIDES MUST BE USED IN ACCORDANCE WITH LABEL DIRECTIONS. READ THESE DIRECTIONS CAREFULLY BEFORE PURCHASING ANY PESTICIDE, AND AGAIN BEFORE USING THEM.

Larvicides: Applied to water bodies where mosquito larvae are present

<i>Bacillus thuringiensis var. israelensis</i> (B. t. i.)	Many trade names – including Mosquito Dunks, Vectobac, and Bactimos.
<i>Bacillus sphaericus</i> (B. s.)	Trade names: Vectolex
Methoprene: (requires aquatic permit for use)	Trade names: Altosid
Monomolecular film (requires aquatic permit)	Trade name: Agnique MMF

Adulticides: used to kill adult mosquitoes

Resmethrin (fog)	Trade names: Scourge (restricted use pesticide) many others
Sumithrin (fog)	Trade names: Anvil
Permethrin (fog/foilage spray)	Trade names: Pramex, Aqua Reslin (restricted use), many others
Malathion (fog/foilage spray)	Trade names: Fyfanon, many others
Deltamethrin (foilage spray)	Delta Gard (restricted use)
Cyfluthrin (foilage spray)	Tempo, others
Bifenthrin (foilage spray)	Talstar (restricted use)
Lambda-cyhalothrin (foilage spray)	Battle (restricted use)
Cypermethrin (foilage spray)	Cynoff (restricted use)
Pyrethrins (fog)	Pyrenone, Syncrol, many others

Restricted use pesticides require a license to be purchased and used.

When hiring a contractor to perform mosquito control, make sure that they hold a pesticide applicator's certificate in the category of mosquito and biting flies. Applicators holding licenses in other categories such as ornamentals and turf or arborist (tree care) may not legally do mosquito control with pesticides.

Many homeowner products are available in aerosol spray cans. Most contain one or more of the above listed active ingredients. Application to larger areas requires equipment such as an ultra low volume fogger, which is usually truck mounted, although backpack foggers are available. Additionally, smaller hand-held fogging machines are sometimes used.

The application of insecticides to foliage is sometimes advocated for mosquito control. This method can kill mosquitoes that alight on the treated foliage. If there is a sufficiently large area of bushes or other treated areas around a yard, this method can provide residual control for about a week. The disadvantage is that mosquitoes can fly over the treated foliage without contacting the insecticide. There are many types of products designed for use in hose-end sprayers which are labeled for this type of application.

This list is provided for public information, and is not meant to be a complete list of all mosquito control products. No endorsement is implied for any product listed above.



CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of Public Health Fact Sheet-- Resmethrin

9/24/99

SCOURGE

What is Resmethrin and how is it used?

Resmethrin is a commonly used insecticide that is used to control mosquitoes and other biting flies. Similar insecticides are used in pet shampoos and sprays and for use around horses and horse stables. Resmethrin is a synthetic chemical derived from natural class of chemicals called pyrethrins.

Is Resmethrin safe to humans?

When used as intended, resmethrin is safe. While the natural pyrethrins can have side effects on the immune system such as dermatitis and asthma-like effects, there is little evidence to suggest that the synthetic pyrethroids (resmethrin included) are allergenic. Some kinds of synthetic pyrethrins are known to cause stinging and burning sensations (paresthesia) after contact with skin, however; paresthesia is not known to occur from exposure to resmethrin or similar pyrethroids. Ingestion of high doses of pyrethrins (either intentional or from accidental poisoning of pesticide workers) can have severe health effects, but; chronic effects from low-level exposures are not known to occur.

Does Resmethrin affect the Environment?

resmethrin spray stays in the air for a very short period of time because the chemical is not volatile. It is removed from the air when droplets of spray contact the surface. Resmethrin in air or in contact with exposed surfaces (vegetation etc.) is rapidly degraded by sunlight. Rain washes any remaining resmethrin down to the ground where it binds tightly to the soil. This binding inhibits the moving of the pesticides to ground water or streams. Resmethrin in soil is then removed by bacteria. Fish and bees are more susceptible to resmethrins effects than birds or mammals.

What precautions should be taken when Resmethrin is being applied?

- All residents, especially children and pets should be brought indoors during spraying.
- Close windows and doors turn off air conditioners.
- Children and pets should be kept from playing in areas that are still wet from spraying.
- Home grown fruits and vegetables should be washed, scrubbed or peeled before eaten.

Important

Encephalitis is a life threatening disease. Controlling mosquito populations with resmethrin will safely decrease the risk of contracting encephalitis.

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It is well known among mosquito entomologists and mosquito abatement personnel that scrap automobile and truck tires often support large populations of certain mosquito species. In southern U.S. two exotic species predominate in tires. These two species (*Aedes aegypti* and *Aedes albopictus*) are known to be the principle vectors of Yellow Fever and Dengue, diseases which afflict millions of people in the tropics. In temperate regions of North America, *Aedes triseriatus* (the native "Eastern Treehole Mosquito") and *Aedes atropalpus* predominate in scrap tires (1). Based on samples taken in 1992, it is clear that these two species are predominant in tires in Rhode Island (personal observ.). Both of these species are known to be competent vectors of Eastern Equine Encephalitis (EEE) (2) and also of LaCrosse Encephalitis (LACV) (1). EEE is endemic to Rhode Island and fatality rates average near 50%. LACV, although much more prevalent than EEE, usually produces relatively mild symptoms in adults. It can cause serious infection and death in children, however (3). One study documented an association between scrap tires and 15 cases of LACV in Wisconsin in 1979 (4). Finally, dog heartworm, which is a growing problem in temperate North America, can also be transmitted by *Ae. triseriatus* (5).

Aedes albopictus (the "Asian Tiger Mosquito") merits special consideration. This species was accidentally transported from Japan to the western hemisphere in the mid-1980's in shipments of used tires. It has since become established in at least 23 states including Indiana and Delaware (6). Based on its native range in Asia, it will likely establish in Rhode Island (7). Its habits are such that it is considered the nation's most dangerous species. That status is because it reproduces rapidly in a wide variety of artificial containers, readily inhabits urban areas, and is a competent vector of EEE (8) and LACV (9). In fact, EEE-infected adults were collected at a large scrap tire pile in Florida in 1991 (6). This finding indicates that this species will readily feed on birds, which are the reservoir for EEE. Since *Ae. albopictus* is known to feed on a wide variety of mammals, it is considered a potentially effective vector of EEE and LACV.

It is obvious that eliminating scrap tires will eliminate a prolific mosquito habitat and the associated disease risks. It is also clear that the spread of the Asian Tiger Mosquito has been hastened by interstate shipments of scrap tires (10). Many states have banned importation of scrap tires for this reason. Where elimination is not feasible, mosquito abatement programs may be compelled to suppress

mosquito populations at tire piles. This task is problematic and costly, particularly at large piles.

To suppress adult mosquitoes at a pile requires the frequent use of adulticides, none of which are environmentally benign. Delivering adulticides effectively is problematic at large piles because it is very difficult to penetrate the pile to the depths where the mosquitoes are resting. Larval mosquitoes are likewise a difficult target to reach, as they most frequently inhabit tires beneath the surface of the pile. Two available larvicides are long-lasting and environmentally benign, but the costs become prohibitive at large piles.

While cost/effectiveness studies of larvicides on large piles are lacking, the results of one study provide a guide for calculation (11). The authors concluded that liquid *B.t.i.* (a bacteria selective for mosquitoes) would be the most effective at large piles because that formulation penetrated their small piles better than granule or pellet formulations. Unfortunately, the liquid formulation is only effective for 7 to 10 days, requiring numerous treatments during a season. This study calculated the liquid cost to be \$2.43 per tire per treatment for the cost of material only. Factoring in the added costs of spraying the pile from a helicopter, it is readily apparent that larviciding is cost-prohibitive at large scrap tire piles.

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