Pesticide Program Update














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UGA Pesticide Safety Education Program

http://extension.uga.edu/programs/pesticide-safety/

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Study guides for core manual and category manuals.

Fee-based training for farmers, foresters, horticultural growers Certificate required for license; 5 yr license; 3 CEUs required to auto-renew; no other fees; right to buy RUPs.

Georgia Competent Applicators of Pesticides Program (GCAPP) testing; 5 yr. certificate, no renewal; no pesticide purchasing rights.

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View items in these sub categories:

Category Manual Study Guides

This tab takes the purchaser to the page listing category manual study guides.

Course 1

Course 1 covers the first four chapters in the National Pesticide Applicator Certification Core Manual Second Edition from 2014. This course is designed to prepare you for the Core Pesticide Safety exam (formerly the General Standards test) for commercial applicators.

Price: $15.00

Quantity: 1

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Covers IPM, laws & regs, labels, & formulations.

Quizzes included for each chapter drawing from question banks; questions and answers rotate.

Course 2

Course 2 covers chapters 5 through 7 of the National Core Manual and is designed to prepare you for the portion of the commercial applicator's core exam that covers the topics pesticide hazards and first aid, personal protective equipment, and pesticides in the environment. The course is interactive and self-guided; you may skip sections of each chapter or entire chapters if you so choose.

Price: $15.00

Quantity: 1

Add To Cart

Covers hazard, PPE, & environmental considerations.

Course 3

Course 3 covers chapters 8 through 11 of the National Core Manual and is designed to prepare you for the portion of the commercial applicator's core exam that covers the topics transportation, storage, and security, emergency incident response, planning the pesticide application, and pesticide application procedures. The course is both

Price: $15.00

Quantity: 1

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Covers transport, storage, security, spills, planning, & application procedures.

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Category Manual Study Guides

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Ornamental & Turf Pest Management (Cat. 24) Study guide

This study guide is designed to prepare you for the Ornamental & Turf Pest Management certification examination in Georgia (Category 24). Questions on the actual examination are based on information presented in this course and information about Federal and Georgia pesticide laws and regulations and safe pesticide handling procedures. The quiz questions presented at the end of each chapter will let you evaluate your understanding of the material presented.

Price: $30.00

Quantity: 1

Add To Cart

Mosquito Biology, Surveillance and Control (Cat. 41) Study guide

This study guide is designed to prepare you for the Mosquito Biology, Surveillance and Control certification examination in Georgia (Category 41). Questions on the actual examination are based on information presented in this course and information about Federal and Georgia pesticide laws and regulations and safe pesticide handling procedures. The quiz questions presented at the end of each chapter are similar to the types of questions you will encounter on the actual examination.

Price: $30.00

Quantity: 1

Add To Cart

Category study guides can replace paper manuals as they cover the entire manual with additional material of interest and value plus quizzes help you evaluate your readiness for the actual exam!

Next, we'll look at a few representative slides from the Mosquito Control study guide and a representative quiz

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Notes

The Permanent Pool Group

Depending upon the species and sometimes climate, mosquitoes can successfully survive the winter in the egg, larval or adult stage. Mosquito dormancy is prevalent in all temperate climates where the year-round climate does not support year-round development. Several factors, especially the latitude, will determine the duration of dormancy, which is the result of the mosquito entering a state of diapause. Diapause refers to a physiological state of arrested development induced by specific environmental cues, such as decreasing daylight hours and decreasing temperatures.

The mosquito species inhabiting permanent waters deposit their eggs on the water surface, singly in the case of *Anopheles* and in rafts in the case of *Culex*, *Coquilletidia*, and *Mansonia* with some variation in place of oviposition in the latter genus. Such sites are sheltered from wave action and are always in the presence of vegetation suitable for larval attachment or protection. There are usually several generations each year. Most *Anopheles* and *Culex* overwinter as adult females, but some may overwinter in the egg stage, while *Mansonia* and *Coquillettidia* overwinter as larvae attached to the roots of plants. During the winter months, larval metabolism is greatly reduced; subsequently, larval development is halted. Typically, larval overwintering takes place in the 3rd and 4th instar stages and in breeding sites that do

Dormancy, influencing factors, and diapause.

Overwintering larvae.

Notes

The Transient Water Group

Culiseta melanura (blacktailed mosquito) is a smaller, very dark species whose larvae develop in water beneath stumps and roots of trees in wooded fresh-water swamps and hardwood bottoms. Adult females feed chiefly on birds, and the species is considered to be the primary vector of eastern equine encephalitis (EEE) from bird to bird. Since it rarely bites humans, it is not the primary vector of EEE virus to humans. Other less host-specific species such as *Aedes*, *Coquillettidia*, and *Culex* species may then transfer the pathogen to humans after taking blood meals first from infected birds. Efforts to reduce *Cs. melanura*'s population are usually made upon the appearance of eastern equine encephalitis virus seropositive sentinels (chickens or other birds) in an area. *Cs. melanura* is a multivoltine species producing multiple generations per year in the southern part of its range. Its flight range is normally 1/2 to 1-mile but may go up to 5 or 6 miles. Adult females favor laying their eggs in habitats with acidic water with a pH of approximately 5.0 along the edges of swamps, flood plains, and woodland pools. If temperatures are cold larvae do not pupate and instead burrow into the bottom sediment and overwinter as 3rd and 4th instar larvae depending upon how late in the season eggs hatch. *Cs. melanura* is not considered to be an important vector of West Nile virus to humans even though West Nile virus has

Culiseta melanura, the black tailed mosquito

A freshwater swamp in Chatham County, GA

Black-tailed mosquito ecology (expanded).

The Transient Water Group

- Important member of the group
- Larval habitats include swamps and hardwood bottoms
- Typically feeds on birds
- Usually does not bite humans
- Transmits eastern equine encephalitis from bird to bird

Notes

Common Problem Species in Georgia

With the introduction of the West Nile virus into Georgia, the bird-feeding *Culex* group has taken on a more important role among the pest species of the state. *Culex* mosquitoes all develop in freshwater habitats such as pools, ditches and ponds. The larvae of *Culex quinquefasciatus*, the southern house mosquito, larvae are often associated with foul water such as effluents of sewage treatment plants and are also found in catch basins, cesspools, polluted ditches and ponds, and in containers holding water around homes and buildings. This species lays eggs in clusters or rafts of 50-500. These rafts float on the surface of the water and hatch within a day or two in warm weather. Under typical summer conditions, 8-10 days are required for completion of the larval and pupal stages. In somewhat cooler weather of early spring or late fall, these aquatic stages may require weeks or more. Species is active only at night and rests during the day. The females are said to show a preference for bird blood, but they often go into homes and feed readily on humans at night. In some areas of the country this species is the primary vector of St. Louis Encephalitis but is the primary vector of the West Nile virus in Georgia.

Aedes vexans, the inland floodwater mosquito, is a very common floodwater/temporary pool species throughout most of the

Common Problem Species in Georgia

- *Culex quinquefasciatus* is primary vector of the West Nile virus in Georgia
  - Lays eggs in clusters or rafts of 50-500
  - Larvae associated with foul water
  - Adults only migrate short distances
  - Active at night and will enter homes and feed on humans at night

- *Aedes vexans* is a very common flood-water / temporary pol species in Ga.
  - Eggs laid in moist depressions with decaying organic debris
  - Hatch after usual sequence of incubation, drying, and flooding
  - Can migrate 5-10 miles from larval habitats
  - Very annoying after dark

Georgia-specific information.

Notes

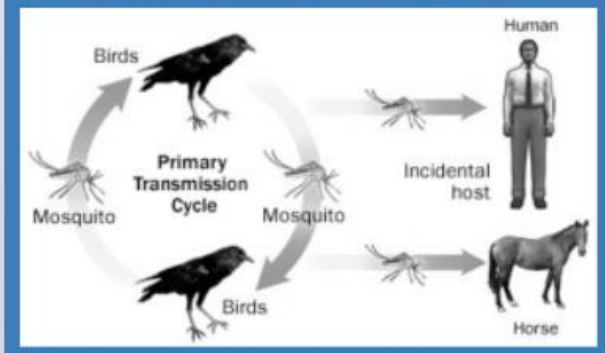
West Nile Virus

WNV exists primarily as an infection of bird populations and is transmitted from bird to bird by several species of mosquitoes. The principal route of human infection with WNV is through the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds, which may circulate the virus in their blood for a few days. The virus eventually moves into the mosquito's salivary glands. During subsequent blood meals, the virus may be injected into humans and animals, where it can multiply and possibly cause illness. Mosquitoes are capable of transmitting the virus to another animal 10-14 days after feeding on an infected bird. Birds in the Corvidae family appear to be very susceptible to the North American strain of this virus, with crows and blue jays being the most susceptible. Epidemiologists quickly recognized this fact and publicized the importance of reporting dead birds to local health districts. This reporting system has proven important to identify areas where active virus transmission is occurring.
Clinical signs of WNV infection also have been observed in horses, even though most horse infections are asymptomatic. However, horse mortality has run in the range of 25-30%. Fortunately, an effective horse vaccine is now available. Cattle, sheep and camels also can be infected with WNV but do not develop sufficient viremia to be capable of infecting mosquito

West Nile Virus

- WNV exists primarily as an infection of bird populations
- Several species of mosquito transmit WNV from bird to bird
- Humans livestock and other mammals can be infected by WNV from infected mosquitoes
- Horses are asymptomatic but mortality rate is 25-30%
- Only birds experience viremias (virus particles in their blood) capable of infecting other female mosquitoes
- Crows & blue jays most susceptible to North American virus

WNV Transmission Cycle



More on transmission cycle

PREV NEXT

Notes

St. Louis Encephalitis

Monitoring for virus activity is done by sampling blood of wild birds, which is important because birds may not exhibit any symptoms. Wild birds, such as sparrows, pigeons, blue jays, and robins, are the primary hosts of SLE virus. Transmission of the virus occurs primarily in late summer and early fall in temperate areas and occurs year-round in the south. The abundance of *Culex* mosquitoes is directly proportional to the abundance of St. Louis encephalitis virus transmission. *Cx. quinquefasciatus*, the southern house mosquito, is thought to be a primary vector of SLE virus in areas where there are many water-filled artificial containers that provide ideal larval habitats for mosquitoes amidst populations of birds such as sparrows and starlings that live and nest in or near human residences. Water-holding structures commonly associated with humans such as storm-sewer catch basins, cesspools, sewage lagoons, open septic tanks, polluted drainage ditches and water runoff impoundments, failed septic systems, drain fields and effluent from sewage disposal plants, also can produce huge numbers of these mosquitoes during the warm months of the year. Rural areas may be highly susceptible to transmission when pastures and other extensive, temporary, freshwater habitats produce large populations of avian-feeding mosquitoes, for example, *Cx. nigripalpus*. The probability of SLE

St. Louis Encephalitis

- Monitoring for virus activity is done by sampling blood of birds
  - Birds may not have symptoms
- Abundance of *Culex* mosquitoes and infected birds related to SLE outbreaks
- After overwintering, *Culex* females lay eggs on surface of organically polluted water
- *Cx. quinquefasciatus* and *Cx. nigripalpus* are primary vectors where they occur in large numbers

Expanded habitat information for Georgia.

Notes

Source Reduction

Source reduction ranges from the simple overturning of a discarded bucket or disposal of discarded used tires to complex water-level manipulations in marshes. Removal or reduction of larval mosquito habitat is your most effective and economical long-term method of mosquito control. These efforts often minimize or even eliminate the need for larviciding in affected habitats and greatly reduce adulticiding in nearby areas. Education efforts include providing homeowners and the public information about the importance of removing used tires from the landscape, the need to maintain and clean out rain gutters, why emptying buckets and other debris of standing water is critical, the need to check tarps and plastics of all types for water-holding depressions, and, in general, **maintaining a constant vigilance toward removing sources of standing water**.

Source Reduction

- Includes simple methods to more complex, long-term methods
- Education is key at the community or neighborhood level
- Inform individual home owners of the importance of eliminating standing water
  - Constant vigilance towards removal of standing water

Notes

Biological Control

Biological control is the use of biological organisms or products to control pests, in this case insect pests. Biocontrol is popular in theory because of its potential to be host-specific with few nontarget effects while being safe for the environment. The most widely used biological control agents for mosquito control are the various biological larvicides produced from the bacterium *Bacillus thuringiensis* subsp. *israelensis* (*Bti*). This bacterium is a common soil bacterium that produces protein crystals during its sporulation process and these proteins are toxic to several species of flies including mosquitoes and black flies. Today *Bti* is produced commercially and formulated in a variety of formulations, including liquid, granular, and briquette products. Another biological larvicide is produced from the bacterium *Bacillus sphaericus*. This bacterium is similar to *Bti*, however its products have demonstrated a longer residual effect due to the actual growth of the bacteriun in mosquito cadavers and the resulting additional production of toxic proteins. Both of these materials are being used by many mosquito districts due to their effectiveness, lack of non-target effects, and acceptance by the public. *Gambusia affinis* or mosquitofish can also be purchased from hatcheries in Georgia during the cooler months. It should be noted that *Gambusia* are extremely aggressive fish and

Biological Control

Expanded definition of biocontrol.

- The use of biological organisms or products to control pests
  - Often little or no impact to non-target organisms
  - Environmental impact is usually low
- Most widely used biocontrol agent is *Bacillus thuringiensis* subsp. *israelensis* (*Bti*)
- *Bacillus sphaericus* similar to *Bti* but has longer residual effect
- Larvivorous fish occur naturally in many aquatic habitats; can be collected and propagated
  - Mosquitofish (*Gambusia affinis*) is very aggressive; use in habitats without native fish

Notes

Protect Pollinators While Applying Barrier Sprays

Bees and other pollinators are quite sensitive to most pesticides used as barrier sprays and there have been a number of instances with formal complaints being filed with the Georgia Department of Agriculture of bees being killed during barrier spray applications by landscape and maintenance companies. You must always follow all label instructions for protecting pollinator species. Look on the pesticide label for a honeybee inside a red diamond; this symbol tells you that there are special precautions that you must follow to prevent harm to pollinator species. You must read and strictly follow these label instructions. In addition, you should always follow some general guidelines for protecting our state's pollinators. When applying barrier sprays for mosquitoes, you should spray in the early morning or late evening when bees are in or have returned to their hives or nests. **Do NOT spray at other times just because it is convenient for YOU!** Late morning to late afternoon applications will likely result in bee kills and this can lead to regulatory fines, lawsuits, loss of reputation, and other negative consequences.

Protect Pollinators While Applying Barrier Sprays

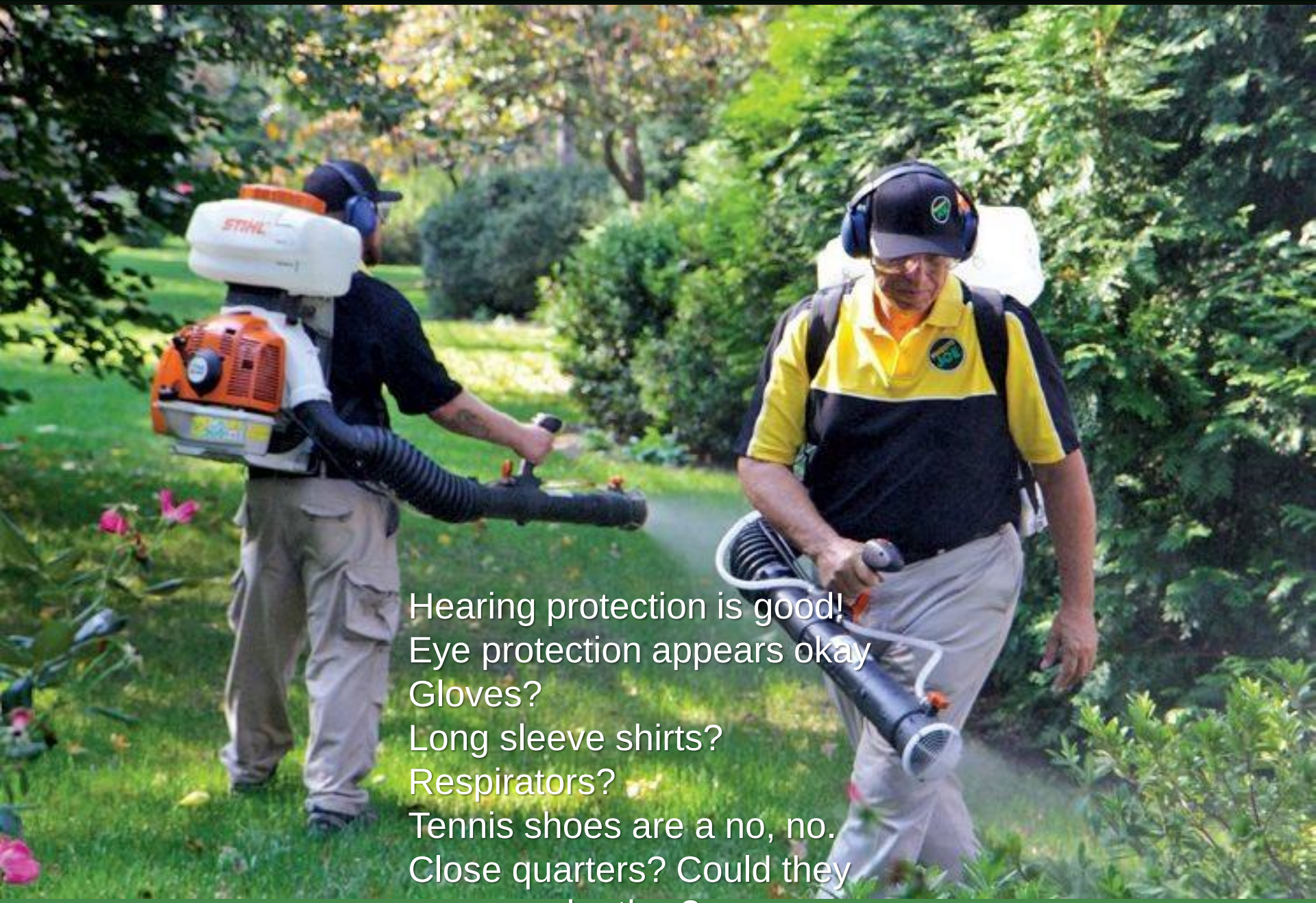
Pollinator protection and GDA enforcement.

- Bees and other pollinators are quite sensitive to most pesticides used as barrier sprays
- You must follow label instructions for protecting these species
- General guidelines for protecting pollinators
  - Spray early morning or late evening to avoid pollinators, NOT at your convenience!
  - Applications during periods of bee activity will likely result in bee kills
  - Bee kills can lead to regulatory fines, lawsuits, loss of reputation, and other negative consequences

Let's See What We Remember About Proper PPE!

- Tell me what's wrong in each case …
  - First:


STIHL
Is this guy doing anything right?
Not even minimum PPE!
Breathing ultra-fine mist particles?
Wrap-around sunglasses okay?
Tripping on hanging line possible?
Hearing protection?

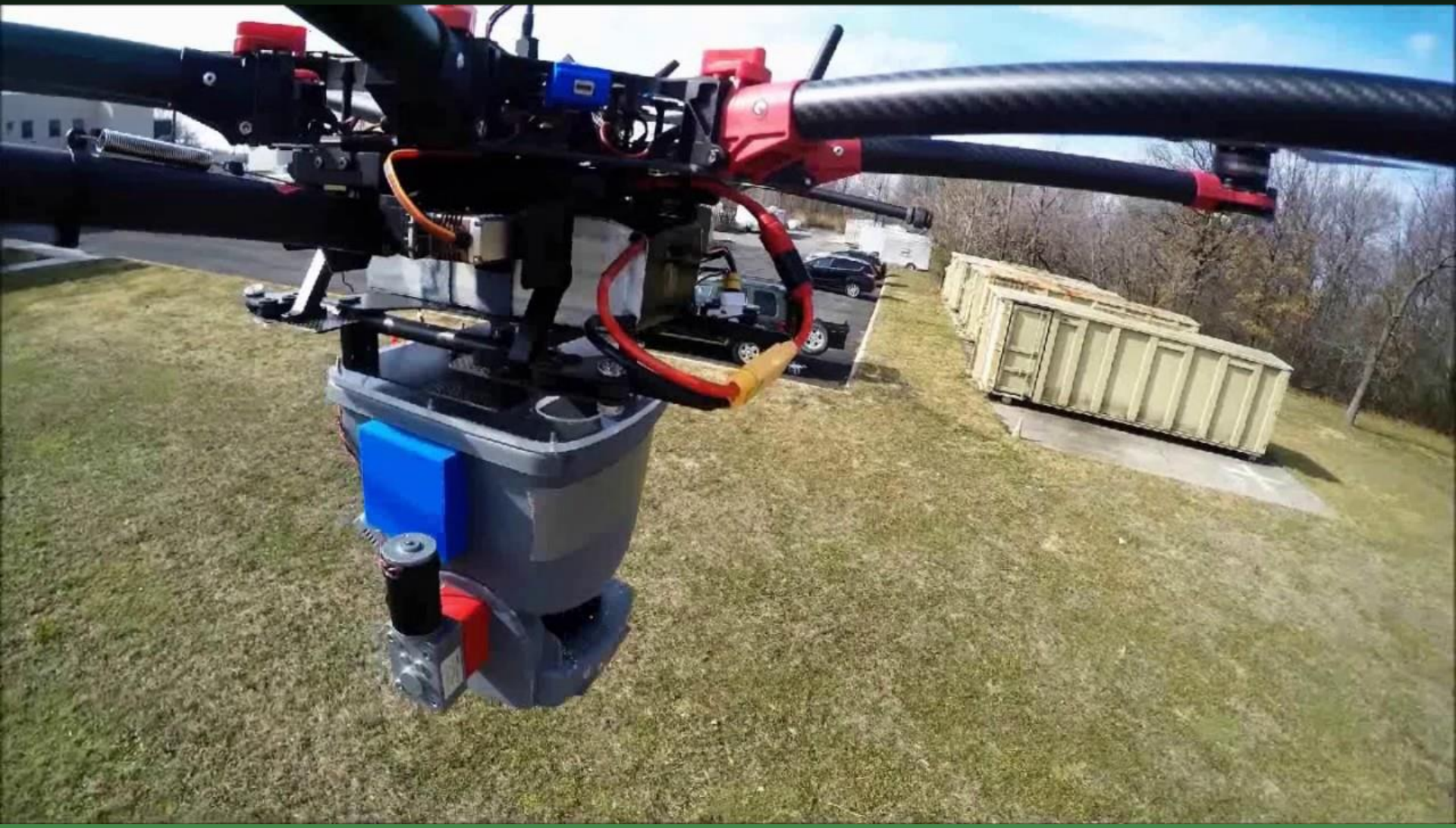

Hearing protection is good!
Eye protection appears okay
Gloves?
Long sleeve shirts?
Respirators?
Tennis shoes are a no, no.
Close quarters? Could they spray each other?

Will a dust mask suffice?
Glove cuffs turned up - better.
Straw hat with ventilation a NO!
Glasses—side & top shields?
Hearing protection?


Long sleeved shirt?
Eye protection, maybe not!
Brimmed hat?
Hearing protection, hard to tell for sure?


Looks pretty good doesn't it except for …
Tyvek pant legs on outside of boots.
Can't tell about eye protection (may be wearing goggles?) or respirator.
Gloves may be inside sleeves?

Granule Applications



Now this is the way to avoid PPE mistakes!


Is PPE required in this case?
Could truck cab be contaminated?
Label defines all!