

Wildlife and Domesticated Animals

NECAFS

The Northeast Center to Advance Food Safety



The Food Safety Modernization Act's Produce Safety Rule (FSMA PSR) sets mandatory standards for growing, harvesting, packing, and holding produce for human consumption.

Farms that are covered by the FSMA PSR will be held to certain standards designed to reduce the presence of foodborne illness causing organisms that can contaminate produce. This factsheet outlines the requirements for covered farms and uses the word "must" when the practice is required by the FSMA PSR.

For farms that may not be subject to the FSMA PSR, it is important to consider the implementation of these practices to ensure your produce is safe.

Introduction

Wildlife and domesticated animals can carry pathogens to produce and food contact surfaces. Therefore, growers need to limit or exclude their access to production and packing areas. The objective of this factsheet is to focus on assessment, monitoring and exclusion practices specific to an operation, whether open to the environment, partially- or fully-enclosed.

The key points covered in this factsheet include:

- Conducting a preharvest crop assessment for potential animal contamination.
- How to determine if a hydroponic or aquaponic operation is partially- or fully-enclosed and the animal and pest monitoring and exclusion practices for both.
- The importance of considering nearby land use when setting up or expanding an operation.
- The importance of creating operational efficiencies that adopt a holistic approach. This includes incorporating animal and pest monitoring and assessment with insect and plant disease scouting.

Wildlife In and Around Hydroponic or Aquaponic Operations

Hydroponic and aquaponic operations operate in a range of building structures. In colder climates it is more likely for these operations to be located inside a heated greenhouse or building. In warmer areas, it is not uncommon to see operations in the open or in partially-enclosed structures. This variation in building structure brings different considerations when managing wildlife and approaches to excluding them. For example, different types

of wildlife, large and small, can enter the production area of an open outdoor operation. However, while a partially-enclosed building may have more protection against large wildlife, smaller animals can still enter through small openings such as uncovered vents or fans.

Fully-enclosed buildings provide the best protection against wildlife; however, small pest animals such as mice and rats can still find ways to gain access.

Preharvest Crop Assessment

Prior to harvest, crops must be assessed for evidence of potential animal contamination. Indicators of contamination can include crop damage through biting or trampling, observation of animals, or animal feces.

Since most hydroponic and aquaponic operations have a continuous production cycle, preharvest crop assessments will be conducted relatively frequently (i.e., prior to every weekly harvest). It is only required that the crops about to be harvest be assessed for contamination. However, ongoing monitoring of the entire production area may be helpful in

understanding patterns of animal movement and factors that may lead to intrusion. This optional monitoring will generate a growing record of animal activity over time.

If contaminated produce is identified at any point, the contaminated portion(s) must not be harvested. Workers must be trained to remove contaminated produce in a way that prevents further contamination of the system or produce, and wash their hands after handling it. If feces are observed contaminating recirculating production water, there is potential for cross-contamination throughout a system.



SEAN FOGARTY

Frog found on lettuce during preharvest crop assessment.

Managing Animals and Pests

The Food Safety Modernization Act Produce Safety Rule (FSMA PSR) preharvest crop assessment and animal and pest monitoring and exclusion practices will vary across hydroponic or aquaponic operations. Determining required practices depends on whether the operation is located in a structure or building and whether that structure or building is partially- or fully-enclosed.

Open or Partially-Enclosed Buildings

Hydroponic and aquaponic operations that are located in the open or a partially-enclosed building must conduct a pre-harvest crop assessment, look for evidence of potential animal contamination, and must never harvest a crop that is visibly contaminated with feces or has signs of animal damage. This includes wildlife and domesticated animals. For operations in partially-enclosed buildings, growers must

also routinely monitor for pests, as such mice, rats, and birds, and take steps to prevent pests from becoming established inside the buildings. This may include installing screens at entry points or placing bait boxes around the exterior of the building.

Fully-Enclosed Buildings

While hydroponic or aquaponic operations that are located in a fully-enclosed building are not required to conduct pre-harvest crop assessment for potential animal contamination, they should still adopt the practice as a way to manage risk. If contaminated produce is identified, it must not be harvested. Additionally, operations in fully-enclosed buildings must routinely monitor for pests, as such mice, rats, and



The discussion in this section applies to both large wildlife, such as deer, raccoons, and wild pigs, and small pests such as mice, rats, and birds.



SEAN FOGARTY

Evidence of a rodent nest. Exclusion practices should also consider space under equipment.

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Managing Animals and Pests (continued)

birds, and take steps to exclude pests from the building.

Since many hydroponic and aquaponic operations are located inside a high tunnel, greenhouse, or other more permanent structure, growers will need to understand if their building meets the partially- or fully-enclosed definition. For some operations, making this determination may be easy if it is located indoors. For example in a warehouse or shipping container. For other operations, such as a greenhouse with a dirt floor, this determination will likely be more complicated and require considering multiple factors.

The FSMA PSR defines a fully-enclosed building as one that

“includes walls on all sides, a floor, and a roof.” It is not always clear whether an operation meets the definition of fully-enclosed. However it is expected that to be a fully-enclosed building, animals and pests are excluded from the operation. For example, a high tunnel with four sides, a dirt floor, a roof, vents, and fans with no screens is likely considered partially-enclosed because it is possible for small animals to enter the production area through the open vents and fans or poor baseboard design and construction.

Therefore, in this example, to meet the fully-enclosed definition a farm will need to consider any areas where animals and pests may still have access and implement the





ELIZABETH NEWBOLD

Always place poison rodent bait boxes on the exterior of the building or structure.

necessary preventive measures to attain exclusion. This might include installing screens over the open vents and fans or enhancing baseboard, curbing, and threshold construction barrier to exclude burrowing animals and pests.

MANAGING ANIMALS AND PESTS



- Combining animal and pest monitoring and crop assessment with regular (e.g., weekly) scouting for insect pests and plant disease can contribute to operational efficiency and crop quality. NEVER harvest a crop that is visibly contaminated with feces or shows evidence of animal damage, irrespective of building type.
- Keep records of any droppings and other signs of animal intrusion found during preharvest assessments or other monitoring of production areas. When possible, track and remove the source. 
- Remove grass and brush regularly from the area immediately surrounding the greenhouse or growing area. This will help to prevent birds, rodents, and insect pests from making homes on-site.
- Store trash and organic waste (e.g., plant debris, fish culls) in secure containers and dispose of them regularly.
- Store potential wildlife attractants in secure containers that cannot be opened by animals. These may include seeds and fish feed.
- Store packing materials properly to prevent contamination from pests.
- Incorporate passive exclusion measures into the structure such as limited entry ways, curbing, buried barriers, tight construction with physical entry barriers such as hardware cloth, ventilation openings that include entry barriers such as netting or screens.
- Remove any bird or other animal nests from the production area, if they appear. 
- If traps are needed to capture pest animals, do not use poison traps in greenhouse settings (chemicals must be labeled for use in the specific application).



Managing Domestic Animals in Hydroponic or Aquaponic Operations

Pets might be part of an operation as working animals (herding dogs or cats used for pest control) or companions. These pose similar risks as wildlife and livestock. Therefore, growers must adopt practices to prevent contamination of produce, food contact surfaces, and packing material by pets, such as cats and dogs. These practices will vary and depend on whether the operation is located in a fully- or partially-enclosed building.

Where domesticated animals may enter partially-enclosed buildings, growers must maintain a system for, and adequately control, the excreta and litter (any absorbent material used as bedding for animals, such as straw). In a fully-enclosed building, growers can choose to exclude domesticated animals from the building entirely or separate them from the operation by location, time, or partition.

FDA guidance has provided the following examples of allowable practices that separate domesticated animals from covered activities by location, time, or partition:

- Animals can visit an administrative office that is separated by a wall that prevents access to the portion of the building in which packing activities occur.
- In entryways to areas of the building in which covered activities are conducted on covered produce, self-closing doors can be used to prevent entrance of domesticated animals.
- In rooms that domesticated animals can access, separate portable equipment and tools that contact covered produce or food-packing materials by storing such equipment and tools in closed cabinets.




ANDREW CHAMBERLIN

Domesticated animals must be managed appropriately to prevent them from becoming sources of produce contamination.

Guard or guide dogs may be allowed within the production area if their presence is unlikely to result in contamination. Growers must ensure that guard or guide dogs, including their fur, saliva, or skin, do not contact produce, food contact surfaces, or food-packing materials. For example, guard or guide dogs must not be permitted to run throughout the building, jump onto equipment or tools, contact the hands of personnel that touch produce, or contact produce itself.

Growers should inform guard and guide dog handlers of the potential for dogs to carry contamination into buildings. They should also ensure that the dogs themselves do not become contaminated (e.g., contact with animal excreta) before entering

the building.  If workers are interacting with animals or their waste, they must practice appropriate hygiene before returning to produce related activities.

AQUAPONICS

- Fish in aquaponics systems may serve as an attractant for other predatory animals. Therefore, fish tanks should be adequately protected from predators.
- Keep fish feed in designated secure storage areas, away from other dry goods and packaging.




Assessing Land for Use in Hydroponic or Aquaponic Operations

Ideally, growers should take into account surrounding land use from a holistic perspective before building or expanding a hydroponic or aquaponic operation. For example, growers should be aware of any animal operations in the vicinity. Dust particles can contaminate produce if an open or partially-enclosed operation is immediately downwind of a contamination source. Feces from animal operations may also impact surface and ground water sources.

As another example, when siting an outdoor or partially-

enclosed operation, growers should look for signs of trails or other evidence of wildlife activity and determine the best approach to managing potential wildlife intrusion. If possible, growers might consider moving the planting location or other management techniques, such as fencing around the perimeter.

It is important to keep records of the land use assessment, management strategies, and actions taken. This allows the grower to track what methods are working and to establish a baseline

to reference during future land use assessments. 

In aquaponic operations where the fish tanks are located in an area that is open to the environment (i.e., not fully-enclosed), growers should assess the tanks for evidence of wildlife intrusion. For example, in the event that a bird of prey is attracted to the fish and deposits feces into the tank, the water may become contaminated. This would circulate pathogens to the rest of the system.

What About Insect Pests?



While not directly discussed in the FSMA PSR, research has shown that good insect pest management can have positive food safety implications. Insects, such as mites, aphids, caterpillars, and thrips are common insect pests particularly if a hydroponic or aquaponic system has a lot of algae build-up. Exposed nutrient solution and growing media provide ideal habitats for algae growth, which can attract insects.

These insect pests may damage and stress crop plants, which can make them more susceptible to pathogen entry. Other types of insect vectors such as cockroaches, ants, and flies can also transmit foodborne pathogens to produce and should be controlled accordingly. When introducing insects intentionally as biocontrols, growers should use high-quality products from a trusted source.



Animal and Wildlife Management Takeaways

Effective animal and pest management calls for a holistic systems approach to risk mitigation. While preharvest crop assessment is required for many operations to catch specific instances of intrusion, growers should understand broader prevention practices that can help to minimize intrusion. This may include 1) understanding adjacent land use, 2) incorporating animal and pest monitoring and

assessment into routine pest scouting activities, 3) implementing hygiene protocols around domestic animal management, 4) adopting passive exclusion techniques, and 5) implementing insect pest management. Adopting a preventive approach will help to deter animals and pests from entering in the first place and will prepare growers to address any instances of intrusion quickly before the issue increases in severity.





Additional Resources

Some of the resource links provided here may be general in nature and can be adapted to hydroponic and aquaponic operations. These links do not represent an exhaustive list of content on this topic and are intended as a starting point to guide the user toward finding additional relevant resources.

Aquaponics Production Manual; A Practical Handbook for Growers.

Beginning on pg. 32 for Integrated Pest Management: <http://www.ksuaquaculture.org/PDFs/Aquaponics%20Handbook%202021%20Updated%20.pdf>

Co-Managing Farm Stewardship with Food Safety GAPs and Conservation

Practices: https://www.wildfarmalliance.org/co_managing_farm_stewardship_with_food_safety_gaps_and_conservation_practices

Hydroponics - Pest Control Strategies:

https://www.youtube.com/watch?v=6rAa6qN_mAY

Rats (and other rodents): <http://go.uvm.edu/rats>

Rat Prevention: Training (Rat Academy):

<https://www1.nyc.gov/site/doh/services/rats-control-training.page>

Risks Posed by Cats on Produce Farms: <http://go.uvm.edu/cats>

Romaine Calm: Breaking Down the Produce Safety Rule - Furry Friends:

<https://agriculture.vermont.gov/produce-program/romaine-calm-breaking-down-produce-safety-rule-furry-friends>

Wildlife and Animal Management Decision Tree: <https://gaps.cornell.edu/educational-materials/decision-trees/wildlife-and-animal-management>



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THIS SYMBOL MEANS YOU CAN FIND ADDITIONAL RESOURCES ON THE TOPIC DISCUSSED ON PAGE 6