

## 2 Safeguards

### 2.1 Artificial lighting

CTU and other storage yards are often illuminated by a number of high light pylons/towers (see figure 6.1). These are normally fitted with gas discharge lamps. Due to the height of the towers and the area that they illuminate the lights are generally “bright” and therefore can attract insect and other [pests](#) from some distance.



**Figure 6.1 Lighting tower**

#### 2.1.1 Lights that attract

Lights that radiate ultraviolet and blue light attract more insects than other types of lights. Examples of these types of lights include black lights, metal halide and fluorescent. Lights that generate heat may attract insects.

#### 2.1.2 Less attractive to bugs

Yellow incandescent, high-pressure sodium and regular incandescent lights radiate less blue and ultraviolet light, thus reducing the attraction of insects to the area.

##### 2.1.2.1 Low-pressure sodium lights

Low-pressure sodium lights do not attract insects. They are efficient, and give off an orange-yellow light. The light gives off less light pollution at night, and is better for stargazers. The light will change the appearance of colours it illuminates, though, because of its orange-yellow glow.

##### 2.1.2.2 LED lighting

New versions of light-emitting diode, or LED, lighting are more efficient and attract fewer flying insects than other traditional lighting. LED lighting has a long lifespan, but can be more expensive for municipalities to install initially. LED lamps are more directional and give off less light pollution.

#### 2.1.3 Considerations

Yard lights that do not give off ultraviolet radiation are considered less attractive to flying insects. Some bugs are attracted to the heat emitted from incandescent street lighting. Some bugs will be attracted to any light, which is called positively phototactic. Some insects, like moths, use light for navigation. Moths use the light from the moon, but when they encounter a brighter source, they move toward it.

### 2.2 Seasonal pest emergence

2.2.1 In any given landscape, there may be hundreds of species and cultivars of native and exotic trees, shrubs, and garden plants. Throughout the growing season, these plants may be attacked by a similarly diverse assortment of insects, including wood borers, leafminers, scale insects, plant bugs, and leaf-feeding caterpillars.

2.2.2 Timing is everything when managing landscape pests. To be effective, insecticides or biological controls should be applied when pests are present and at their most vulnerable life stage. For example, scale insects are best controlled after the eggs have hatched but before the crawlers have formed a protective cover. Controlling wood borers requires treating host trees with insecticides to intercept the newly hatched larvae before they have penetrated the bark. Leaf-feeding caterpillars such as bagworms and tent caterpillars are easiest to control when the larvae are small. Timing is especially important when using short-lived materials such as summer oils, soaps, and *Bacillus thuringiensis*.

2.2.3 Frequent in-the-field inspection is the most reliable means to detect insect problems and time control efforts. Unfortunately, regular monitoring is too time-consuming for many landscape managers. Field workers may not know when or where to look for vulnerable life stages or may not recognize them when encountered. [Pests](#) such as the holly leafminer, honeylocust plant bug, and potato leafhopper feed in advance of any recognizable damage. Pheromone traps are available for monitoring certain insects (e.g., clearwing borers) but require time and expertise to use effectively.

## 2.3 Forecasting using plant phenology

2.3.1 Phenology is the science dealing with the effects of climate on seasonal biological events, including plant flowering and insect emergence. Insects are cold-blooded, and like plants, their development will be earlier or later depending on spring temperatures. Since both plant and insect development are temperature dependent, seasonal appearance of particular insect pests should follow a predictable sequence correlated with the flowering of particular landscape plants. In a three-year research project <sup>[1]</sup>, the seasonal development and emergence of 33 important insect pests were systematically monitored and tracked resulting in the creation of the timetable below. This information would help landscape managers and lay persons anticipate the appearance of important insect pests and effectively schedule control measures.

2.3.2 Using this science it is possible to develop a table which predicts the sequence and date of emergence of particular insects, pests or other species that could constitute a biotic threat if transported overseas. Seasonal emergence of each pest is correlated with the flowering of 34 familiar landscape plants.

## 2.4 Occasional pest outbreaks

2.4.1 Occasional invaders are insects and other arthropods that sporadically enter facilities and in particular CTUs, sometimes in large numbers.

2.4.2 By far the most common problem with occasional invaders is that they become an annoying nuisance. Some can bite, pinch, secrete foul odours, damage plants, stain indoor furnishings, and damage fabrics. Even after they are dead, the problem may continue. The bodies of dead insects can attract other pests that feed on them, and the bodies, shed skins, secretions and faeces of insects can cause allergic responses and trigger asthma.

2.4.3 Whether they're insects, mites or arthropods, occasional invaders typically live and reproduce outdoors. They invade structures when conditions indoors are better for them than outdoor conditions. It is important to know the conditions that prompt invasions of unwanted pests. Altering environmental conditions can make structures inhospitable for pests, and is an important component of integrated pest management.

### 2.4.4 How to stop occasional invaders

2.4.4.1 Exclusion is the first step to prevent all occasional invaders. Exclude them by ensuring that CTU doors are kept closed and that the seals are properly positioned. However, the vents found on many CTUs will permit insects to gain entry. It is therefore important to inspect CTUs interiors before use and/or movement.

2.4.4.2 Habitat modification is another important control method. A plant-free band of rock, gravel or other inorganic material extending away from the facility essentially puts a barrier between occasional invaders and the CTUs. Organic material, such as soil, leaves, mulch, bark, grass and ground covers, retain moisture which attracts pests and also provides food and shelter for them. Leaky pipes, faucets, misdirected downspouts and faulty grades can also provide moisture that attracts not just occasional invaders but many other pests including termites. The environment around a structure also can be manipulated by reducing outdoor lighting. Mercury vapour lights can be replaced with sodium vapour lights which are less attractive to insects. Low-wattage, yellow "bug light" bulbs can be used and shielded to reduce pest attraction. Indoors, windows and doors should be shaded so little or no light is visible from outside.

2.4.4.3 Various mechanical controls also can be employed. When pests enter in significant numbers, it is best to remove them with a vacuum cleaner. After vacuuming, seal them in bags and dispose of them promptly. Pests that cluster outdoors can sometimes be deterred, or at least discouraged, by spraying them with a water hose.

2.4.4.4 Traps are another useful mechanical control. Insect monitors, or sticky traps, can be purchased at local hardware stores, home and garden centres, from some pest control suppliers, or through the Internet. Sticky traps are simply cardboard with an adhesive that pests stick to when walking across them. When positioned indoors at likely entry points, on either side of doors, for instance, they can help monitor for pest intrusions. When numerous pests are caught on sticky traps in the garage, it may be time to apply additional methods before things get worse.

2.4.4.5 For pests attracted to lights, commercial light traps can be used, or makeshift light traps can be assembled for rooms where invaders congregate. Surround the lights with sticky traps.

2.4.5 Chemical control with pesticides also can be integrated into pest management plans, but consider using pesticides only after other methods fail. Baits, dusts and granular formulations, can be used in some situations (see discussions above). Total-release aerosols (known as "bombs" or "foggers") are generally of little use in combating occasional invaders. These products may not penetrate deeply enough into cracks and voids to contact the pests hiding there. Pesticide application directly into nooks and crannies that harbour pests such as boxelder bugs and lady beetles is also often recommended, but treatment of wall and window frame voids, above false ceilings, etc., can be counterproductive. First, pests killed in these spots are often difficult to remove and are attractive to pests that feed on dead insects. Also, when exposed to accumulations of insects, some people develop allergic reactions to the insect fragments, shed skins and faeces. As an alternative to the direct treatment of voids, pests can be allowed to overwinter in them and emerge when temperatures warm up, at which time they can be killed and collected.

2.4.6 In most cases, the most effective and least hazardous pesticide applications for control of occasional invaders are outdoor applications. These involve residual pesticides applied in a band to the ground immediately around the foundation, the foundation wall, and sometimes around other potential points of entry including door and window frames, around vents, and where utility lines enter.

2.4.7 Microencapsulate, wettable powder, and suspended concentrate products work well for perimeter treatment because they don't soak in to porous surfaces as much as other formulations and adhere more easily to pests. But the timing of perimeter treatments is critical to success. Applications at times when pests are not likely to enter the structure, after pests have already entered, or with ineffective products, can needlessly expose people, pets and other non-target organisms to pesticides while providing little or no control. The use of pesticides may be best left up to pest management professionals.

**NOTE:** When pesticides are used, it is the applicator's legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, may be a violation of local regulations.

[1] Timing Control Actions for Landscape Insect Pests Using Flowering Plants as Indicators, G.J. Mussey, D.A. Potter, and M.F. Potter: Department of Entomology, College of Agriculture, University of Kentucky.