8.2.4 Cleanliness

8.2.4.1 All CTUs should be provided clean and free from contamination, but the type will dictate the standard that can be expected.

8.2.4.2 Closed CTUs should be clean, dry and free of residue and/or persistent odours from previous cargo.

8.2.4.3 Open CTUs should be free from debris and as dry as is possible.

8.2.4.4 Following receipt of the CTU the packer should prevent recontamination. Examples of recontamination will be the presence of any of the following:

- Soil;
- Plants/plant products/debris;
- Seeds;
- Moths, wasps and bees;
- Snails, slugs, ants and spiders;
- Mould and fungi;
- Frass (insect and bird droppings or waste);
- Egg sacs;
- Animals (including frogs), animal parts/blood/excreta and reproductive components or parts thereof;
- Other contamination that shows visible signs of harbouring pests or invasive alien species (including alien species which carry risks of becoming invasive at the site of arrival of CTUs).

8.3 Positioning CTUs for packing

8.3.1 Wheeled operation

8.3.1.1 Road trailers and containers on chassis can be left at the packer's premises for a period of time without a tractor unit. When this happens, the correct positioning of the CTU is particularly important as a safe shifting of the CTU at a later stage might be difficult. After positioning, brakes should be applied and wheels should be chocked.

8.3.1.2 Trailers with end door openings and general purpose freight containers on chassis can be backed up to an enclosed loading bay or can be positioned elsewhere in the premises. For this type of operation a safe access to the CTU by means of suitable ramps is required.

8.3.1.3 Where the CTU cannot be closed in situ because of the loading bay structure, or where to secure the area the CTU would need moving then the packer should consider positioning the CTU so that the doors to the facility and/or the CTU can be closed and access gained by a removable ramp.

8.3.1.4 When a semi-trailer or a container on a chassis is to be packed, care should be taken to ensure that the trailer or chassis cannot tip while a lift truck is being used inside the CTU.

8.3.1.5 For more information on positioning and securing wheeled CTUs, see annex 5, section 2.1.

8.3.2 Grounded operation

8.3.2.1 CTUs may be unloaded from the delivery vehicle and be placed within secure areas for packing. Proper lifting equipment is required.

8.3.2.2 When landing CTUs it should be ensured that the area is clear of any debris or undulations in the ground that may damage the understructure (cross members or rails) of the CTU.

8.3.2.3 Grounded CTUs will deform to the ground on which they are placed, therefore it is important that the area should be firm, level and well drained. Failure may result in:

- The CTU racking if the ground is not level which may result in the doors being difficult to open and, more importantly, close;

Annex 6. Minimizing the risk of recontamination

1 Introduction[1]

1.1 The delivery of a clean CTU to the packer is of little use if the CTU becomes recontaminated during its movement within the supply chain. Appropriate measures should be taken to ensure recontamination does not occur. This should include:

- Storing the CTU an appropriate distance away from pest habitats or resident pest populations (the distance will depend on the pest);
- Storing the clean CTU in areas free of risk from recontamination by vegetation, soil, free standing water or unclean CTUs;
- Taking species' specific measures where quarantine pests are nominated by importing countries;
- Fully paved/sealed storage and handling areas;
- Safeguards should be applied in specific situations to prevent attracting pests such as when using artificial lights, or during seasonal pest emergence periods and occasional pest outbreaks.

1.2 Where CTUs are moved to a storage area, packing area, port of loading, or are transiting through another country, prevention measures should be taken to avoid contamination.

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.

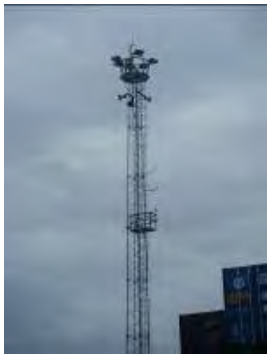

Figure 6.1 Lighting tower

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.

[1] Relevant definitions are given in chapter 2 of this Code.

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 [2] , 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 position. 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] 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.

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.

3.4.4.3 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.

3 Pests, insects, animals etc. that can cause recontamination

3.1 Soil

3.1.1 Soil can contain spores, seed and eggs of one or more invasive alien species, and therefore should not be carried on or in the CTU internationally. Soil can be found at floor level in the internal corrugations of the side wall, in the internal angles of the corner posts and externally in the corner fitting apertures and body, fork pocket openings and on the upper surfaces of the cross rail bottom flanges (see figures 6.2 and 6.3).

Figure 6.2 Mud in corner fitting

Figure 6.3 Mud in fork pocket

3.1.2 Recontamination of the CTU will generally result from positioning the CTU on mud, or a soft surface. Care should be taken to prevent the CTU from scraping across the ground surface.

3.1.3 Soil can also enter the CTU on the feet of persons, on the wheels of handling equipment and on the packages or goods themselves.

3.1.4 Soil should be swept out and bagged for incineration or washed out using a high pressure spray.

3.2 Plants/plant parts/debris and seeds

3.2.1 Plants can grow on CTUs if residual seed has been allowed to germinate with or without contaminating soil (see figure 6.4). Other plant matter found on CTUs includes leaves and other plant parts. Leaves can harbour spores and bacteria that can harm crops at the destination.

Figure 6.4 Previous cargo debris

3.2.1.1 Moths

Figure 6.5 shows examples of moths.

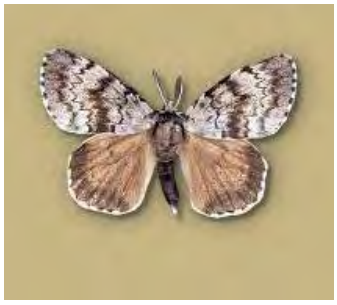

Figure 6.5 Asian gipsy moth

3.2.1.2 Snails and slugs

Figure 6.6 shows examples of snails.

Figure 6.6 Giant African snail

3.3 Ants

3.3.1 Some ant species are considered pests, and because of the adaptive nature of ant colonies, eliminating the entire colony is nearly impossible. Pest management is therefore a matter of controlling local populations, instead of eliminating an entire colony, and most attempts at control are temporary solutions.

Figure 6.7 Pharaoh ant

Figure 6.8 Carpenter ant nest

3.3.2 Ants classified as pests include the pavement ant, yellow crazy ant, sugar ants, the Pharaoh ant (see figure 6.7), carpenter ants (see figure 6.8), Argentine ant, odorous house ants, red imported fire ant and European fire ant. Populations are controlled using insecticide baits, either in granule or liquid formulations. Bait is gathered by the ants as food and brought back to the nest where the poison is inadvertently spread to other colony members through trophallaxis. Boric acid and borax are often used as insecticides that are relatively safe for humans. Bait may be broadcast over a large area to control species like the red fire ant that occupy large areas.

3.3.3 Individual ants should be swept out of CTUs if possible, but larger colonies or infestations, require the entire colony to be destroyed and removed for incineration.

3.4 Bees and wasps

Figures 6.9 and 6.10 show examples of wasp and wasp nest.

Figure 6.9 Sirex wasp

Figure 6.10 Sirex wasp nest

3.5 Mould and fungi

When CTUs are left in damp, dark conditions fungi and other airborne spores can lodge and grow on the residual soil left on surfaces of a CTU.

3.6 Spiders

Figures 6.11 and 6.12 show examples of spider and spider eggs.

Figure 6.11 Wolf spider

Figure 6.12 Spider eggs

3.7 Frass

3.7.1 Frass is the fine powdery material phytophagous (plant-eating) insects pass as waste after digesting plant parts. It causes plants to excrete chitinase due to high chitin levels, it is a natural bloom stimulant, and has high nutrient levels. Frass is known to have abundant amoeba, beneficial bacteria, and fungi content. Frass is a microbial inoculant, also known as a soil inoculant, which promotes plant health using beneficial microbes. It is a large nutrient contributor to the rainforest, and it can often be seen in leaf mines.

3.7.2 Frass can also refer to the excavated wood shavings that insects like the carpenter ants kick out of their galleries during the mining process. Carpenter ants do not eat wood, so they discard the shavings as they tunnel (see figure 6.13).

Figure 6.13 Wood frass from boring insect

3.7.3 Frass is a general sign of the presence of a wood boring or another insect and therefore in need of cleaning. It is essential that affected plants or timber be removed and incinerated.

3.8 Animals (including frogs)

Figure 6.14 shows examples of animals.

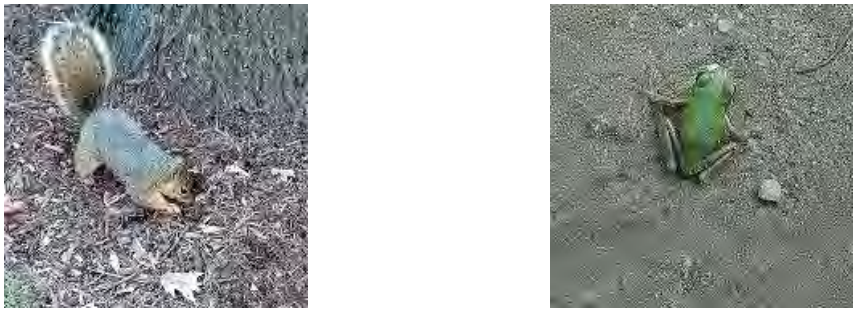

Figure 6.14 Squirrels and frogs

4 Contaminant treatment

4.1 The contaminant treatment method should be that most effective for the contamination present. Consideration should be given to containment and treatment of pests that have a potential for spread. In some cases national authorities may request the specimen be collected for identification purposes.

4.2 If a CTU is found to have a minor recontamination, cleaning can be effected using one of the following methods:

- Sweeping out or vacuum cleaning the CTU and applying an absorbent powder if required;
- Using low pressure water wash;
- Scraping.

4.3 If a live animal or insect is found which can be swept or washed out then this should be done. Bodies of animals should be disposed of safely by bagging and incineration. If the animal is considered as too dangerous to remove, then close the CTU's doors and inform the CTU supplier.

4.4 Intermodal operators may have contracts with pest control organizations who may be employed to remove serious recontamination.

4.5 Examples of contaminant disposal methods

4.5.1 Bagging

Most operators within the supply chain can only resort to this option, where any pest or animal waste is placed within bag, sealed and then into a sealable containment bin for collection by a suitable pest control organization (see figure 6.15). It is essential that there is no opportunity for the sealed bags to be attacked by other animals which could spread the pest contamination.

Figure 6.15 Quarantine waste

4.5.2 Incineration

4.5.2.1 High temperature

High temperature incineration requires a temperature of 10,000 °C and is unlikely that operators will have a facility to achieve this. Therefore any waste that should be incinerated using high temperature should be passed onto a suitable facility.

4.5.2.2 Low temperature

Incineration within a local incinerator for general waste may be suitable for timber and other non-animal waste.

4.5.3 Deep burial

Deep burial requires quarantine waste to be buried below at least 2 m of non-quarantine waste. It is unlikely that this disposal method for supply chain operators.