6. Preparation of adults for release

STEP IV OF PROCESS IN FLOW CHART IN APPENDIX 2

Sterile adult flies that are released using paper bags do not need to be chilled before release. In the case of the chilled adult release system, sterile adults are chilled in pre-cooled emergence rooms as described below. Basically the chilled adult release system allows for a more efficient handling of sterile flies which results in healthier sterile flies being released. This is reflected in a more uniform distribution of flies in the field and a better recapture rate. It also solves the problem of accumulation of great amounts of paper trash, a serious concern of the paper bag release method. Release methods, while operationally convenient, may not be always optimal in terms of sterile male performance. Therefore, the effects of different process need to be assessed. There is an indication for some species of fruit flies that chilling adult flies may have a detrimental effect on quality or quantity. Thus effects on sterile male performance of a cold knockdown procedure needs to be investigated (IAEA 2004).

6.1 CHILLING OF ADULT FLIES IN PARC BOXES

Procedures are as follows:

- Determine that the flies have reached the time for release by checking the emergence grids (a device that holds 100 pupae in individual cells) and comparing it to the expected percent of emergence.
- The required amounts for a day's release of stacked PARCs are moved from the emergence areas to a cold rooms for immobilization by exposure to temperatures in pre-cooled cold rooms in the range of 3 to 5°C for 10 to 30 minutes.
- The aerial release box is also pre-chilled at this time in the same room.
- Once flies are determined to be immobile (a visual inspection of the flies is done to verify immobility); the straps are removed. Food is removed and discarded.
- The PARCs are slammed on a table top to dislodge flies adhering to all surfaces within the containers; the lid is removed and bags inside PARCs are shaken to remove any additional flies and then the bags are disposed of.
- Flies are then dumped into the collection hoppers that are in turn used to load the release box.

6.2 CHILLING OF ADULT FLIES IN TOWERS

Procedures are as follows:

- In the tower system, the ventilation fan is removed and the towers are moved into the cold rooms.
- A "knock down" fan (high volume movement fan) is placed on top of each tower to facilitate the movement of air through the towers.
- After about of 10 to 30 min., flies are immobile (a visual inspection of the top tray will show this) and the fans are shut down and removed from each tower as the knock-down proceeds.
- The towers are positioned under the vacuum and processed from the top down.

FIGURE 6.1
Loading of release box into a truck for transportation to the airport.

FIGURE 6.2
Loading of a release box into a fixed-wing aircraft.

Steps are:
Food is removed and discarded; puparia are vacuumed from the edges of the tower tray; flies are removed by tapping each tray on the cross bars of the collection hopper (care should be taken that the trays are horizontal when tapped on cross bars).

- Flies are then dumped into the collection hoppers that are in turn used to load the release box.

No statistical difference in terms of quality of the sterile flies has been found between emerging and holding sterile medflies in PARCs and in Towers. Eclosion towers save space and labour (Shelly *et al.* 2006).

6.3 LOADING AND TRANSPORTATION OF RELEASE BOXES WITH CHILLED ADULTS FOR AERIAL RELEASE

Procedures are as follows:

- The release box must be inspected to ensure the slide on the bottom is in place prior to loading.
- The release boxes are weighed prior to and after loading to determine the weight of flies to be released.

FIGURE 6.3
Loading of paper bags into a fixed-wing aircraft.

FIGURE 6.4
Paper bags inside a fixed-wing aircraft.

- Flies are collected (3 to 5 g samples) prior to release from each shipment for quality control tests as well as a means of determining the individual fly weights.
- The number of flies per release box is calculated by dividing the total fly weight by the individual fly weight.
- Care should be taken when loading release boxes with sterile flies to ensure against compaction of flies. In addition to causing damage to flies, compaction results in flies being released in balls instead of a steady stream affecting the uniformity of fly distribution. It also prevents the proper operation of the release equipment (see **Table 7.1**). Compaction can be reduced by eliminating excess humidity and reducing as much as possible vibrations inside the aircraft (Tween 2006).
- The release box is then transported (if local situations require, air conditioned vehicles need to be used for transport) to awaiting aircraft where it is loaded on the pre-chilled release machine.
- The slide is then removed from the release box enabling flies to drop onto the screw augers.

6.4 LOADING AND TRANSPORTATION OF PAPER BAGS FOR AERIAL RELEASE

It is recommended that the truck that will take the bags to the airport, is used exclusively for sterile fly transport and is never used in transport of insecticides or toxic substances. The truck should have shelves and a temperature control unit. To provide suitable conditions, the temperature must not exceed 20°C. The bags are loaded in shelves or other structures. It is strongly discouraged to pile up the bags, since it can result in severe damage to adults. For space saving, every other bag is placed upside down.

To prevent damage to the insects because of high temperatures, the bags are taken from the truck only when the aircraft is ready to be loaded. The bags are placed over trays and immediately are loaded onto the aircraft. The number of bags to be loaded depends on the capacity of the aircraft. Most common fixed-wing aircraft used are Cessna, Pipers or similar, which can carry 300 to 800 bags per flight equivalent to 1.5 to 5 million emerged sterile flies per flight (see **Table 7.2** and **Figure 6.3**). Nevertheless, precautions must be taken to avoid the cabin becoming crammed with bags, crushing bags, with the subsequent damage to the insects, **Figure 6.4** (Castellanos 1997, Programa Regional Moscamed 2002, Reyes *et al.* 1986, SAGARPA 1999, SAG 1994, Tirado and Gomez-Escobar 2005).

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