Trapping in pest management

• Trap crops – plant that attracts pests; can be sprayed with insecticide.

• Attract-and-kill: pests attracted to a pesticide laced lure.

• Physical traps – with or without lures; different colors; light traps.

• For monitoring pests; sometimes useful in pest suppression through mass trapping.
Types of chemical attractants

• Pheromones – sexual signals; aggregation signals; alarm signals.

• Kairomones – signals perceived by pest, not primary role of stimulant.

• Analogues of the above – often use easy to obtain chemicals that can be used in traps, mimic pheromones or kairomones.
Uses of traps

- Monitoring – track flights of insects; biofix data; influx of pests.
- Determine distribution of insects.
- Draw pests away from fruit etc.
- Mass trapping as a suppression option.
Scenarios where trapping may suppress pests

• In closed systems – greenhouses;

• Where pests can be adequately drawn away from the target crop;

• In situations where there is not extensive immigration of pests into the crop system.
Trapping coffee berry borer

• What trap designs are available and effective?

• What lures are most suitable?

• How useful is trapping for monitoring vs. suppression?

• How can trapping be integrated with other suppression options?
Trap designs

• Modified plastic bottle (da Silva et al. 2006); transparent green most effective (with high release rate of attractant).

• White and red multi-funnel traps (Lindgren 1983).

• BROCAP® trap (Dufour et al. 2004) – resulted in ~80% reduction in infestation levels.

• Dufour & Frerot (2008) showed that red traps are more effective.
Lindgren multi-funnel trap

BROCAP Trap (CIRAD)
Japanese beetle Trap – Burbano (2010), showed that this is more effective than Lingren traps for black twig borer in coffee.
DIY plastic bottle trap;

Instructions at http://www.ctahr.hawaii.edu/Site/TrapCBB.aspx

(Burbano 2010)
Lures

• Methanol, ethanol mixes: da Silva et al. (2006) used 1:1 ratio. 720 mg.day\(^{-1}\) release rate best, with green bottle trap.

• Methylated spirits (methanol) shown to be effective (Magina et al. 2006).

• Inclusion of coffee extracts, berries etc no more effective than meth: eth. (Dufour & Frerot 2008).

• Commercial lures, methanol: ethanol 3:1 (AgBio, Colorado).
Trap height

- Maximum trap rate with traps at 0.5, 1.0 and 1.5 m above ground (Uemura-Lima et al. 2010).

- 1.2 m above ground superior to ground level (Dufour & Frerot 2008).
Monitoring

• Literature suggests that 1:1 ratio of methanol: ethanol effective; some traps more useful; homemade traps probably adequate.

• Commercial lure is 3:1 meth:eth.

• Traps suspended at 1.2 m above ground should be suitable.
Pest suppression

- Dufour & Frerot (2008) suggest 22 traps per hectare for suppressive mass trapping.

- Dufour et al. (2004) showed that BROCAP traps can catch massive numbers of CBB; reduced infestation by ~85% (with about 22 traps per hectare).

- Dufour suggests that ~90% suppression can be achieved if effective sanitation (removal of infested dropped berries) is applied in concert with intensive trapping.
Prospects for suppression in Hawaii

- Extensive feral coffee, abandoned farms, other neglect – extensive CBB breeding grounds; mass trapping is unlikely to suppress the pest if this persists.

- Mass trapping may be useful in pest suppression if an area-wide approach is adopted – requires collaboration of all growers in an area.

- Integration with other options such as *B. bassiana*, CBB deterrents, with trapping primarily for monitoring is probably the most useful application currently.