

Sampling and Monitoring of Stored-Grain Insects

Detection

- ❖ Looking for presence or absence of an insect or an infestation (with respect to your sampling device)
- ❖ The type of device used and the number of samples taken determine how good you are in finding an insect or an infestation

Monitoring

- ❖ Tracking trends in insect numbers or infestation levels over time
- ❖ Helps you know when to take action
- ❖ Helps you understand how populations are behaving with respect to environmental conditions
- ❖ Helps you assess effectiveness of pest management actions

Detection and Monitoring Require Sampling

- ❖ Counting all insects in a bin is difficult
 - ❖ Their distribution is unknown
 - ❖ It may take forever to count all insects present
- ❖ Time and money are limited
- ❖ Sampling will help in making inferences about the insects inhabiting a bin or silo

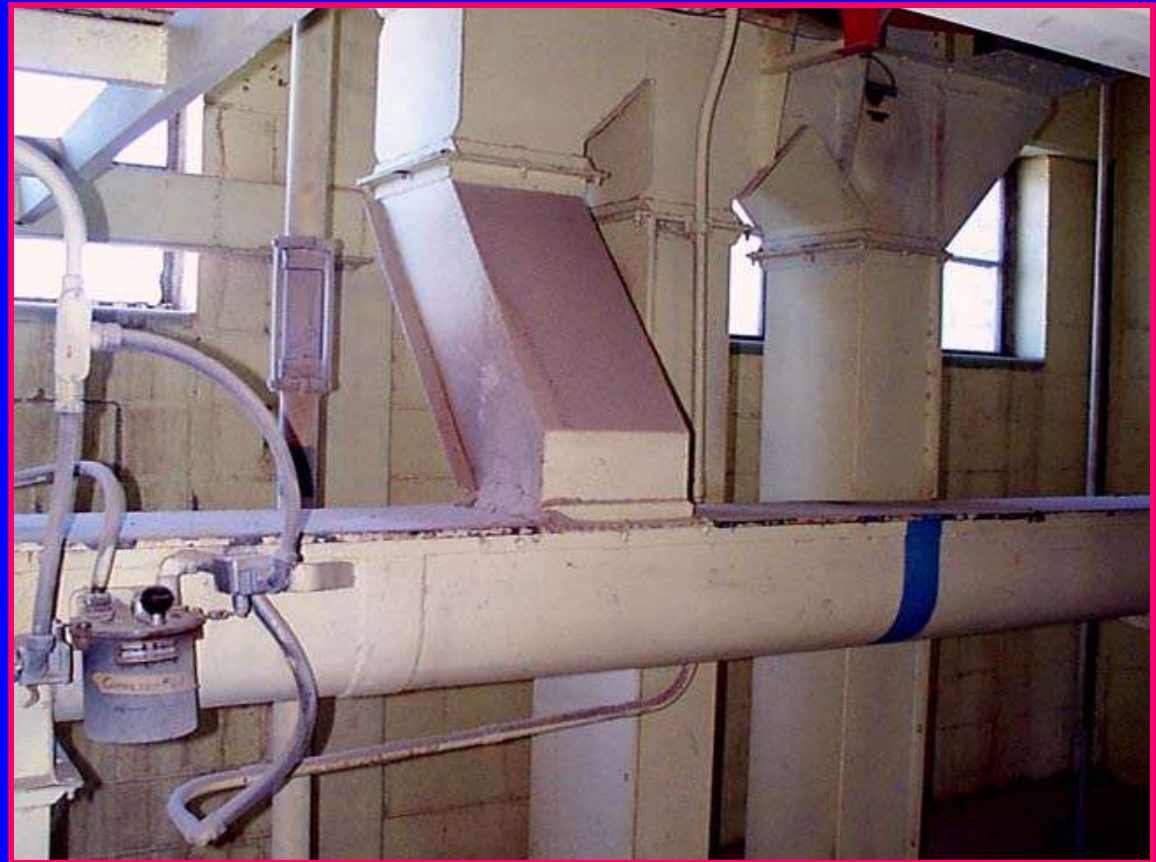
Case study: Infestation in Cereals

- ❖ 24 (3 kg) wheat samples/railcar were taken from 8 railcars
- ❖ 1024 insects were found in 8 railcars
- ❖ 3% of insects were found immediately after sample collection
- ❖ 77.1% were found 7 weeks after sample incubation

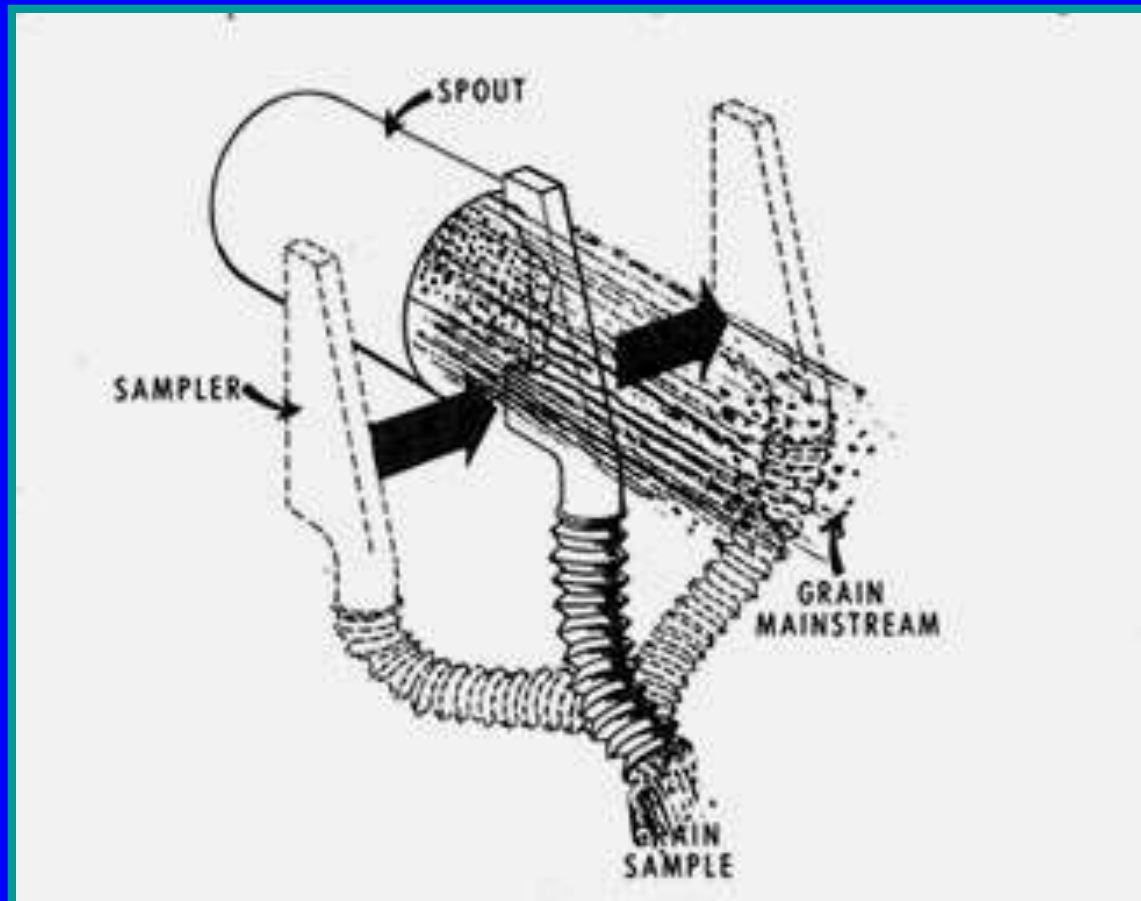
- ❖ Relevance to detection??
- ❖ Relevance to fumigant efficacy??

Grain Sampling Methods

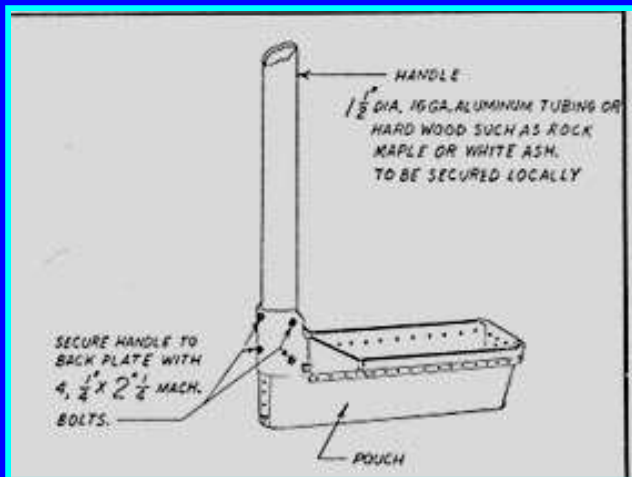
- ❖ Diverter-type sampler
- ❖ Pelican
- ❖ Ellis cup
- ❖ Grain trier
- ❖ Vacuum probe
- ❖ Scoop

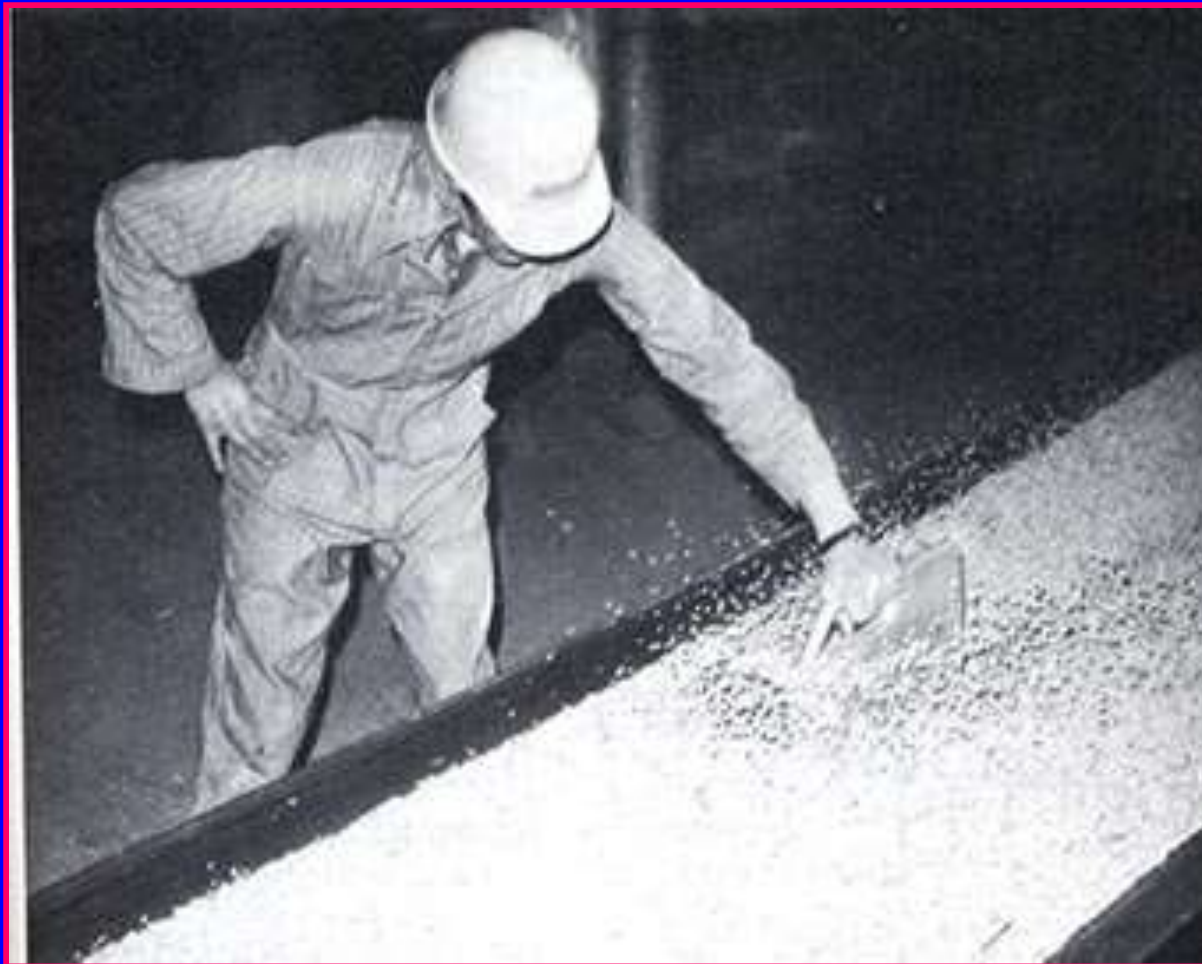


Diverter

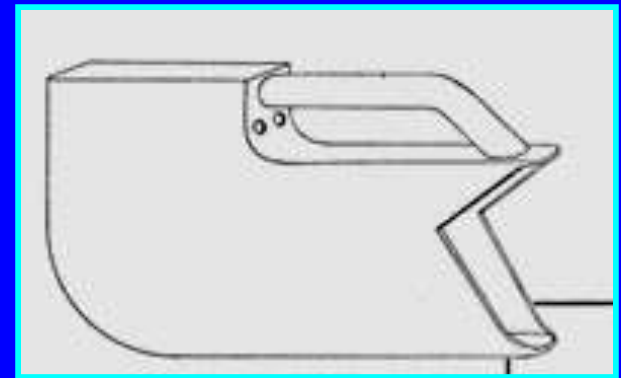


Pelican Sampler





Ellis Cup



Grain Bulk

- Probe sampler
- Spear or trier





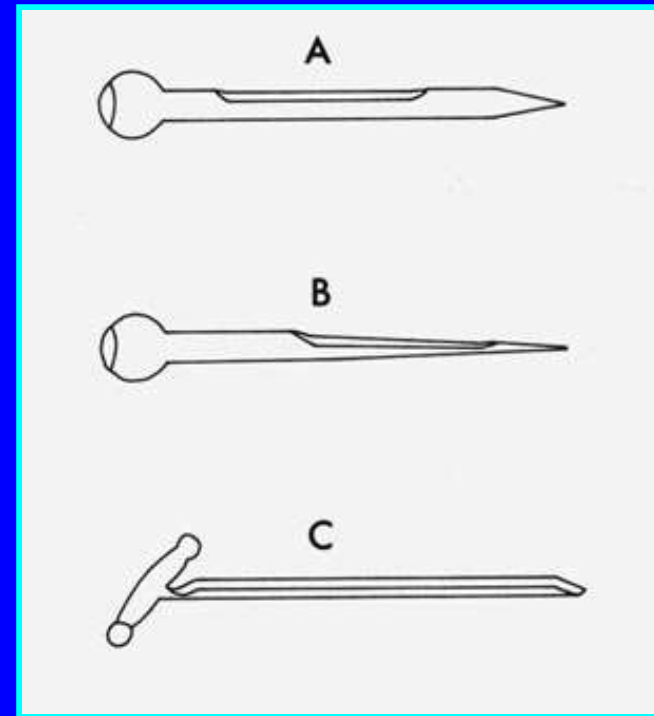
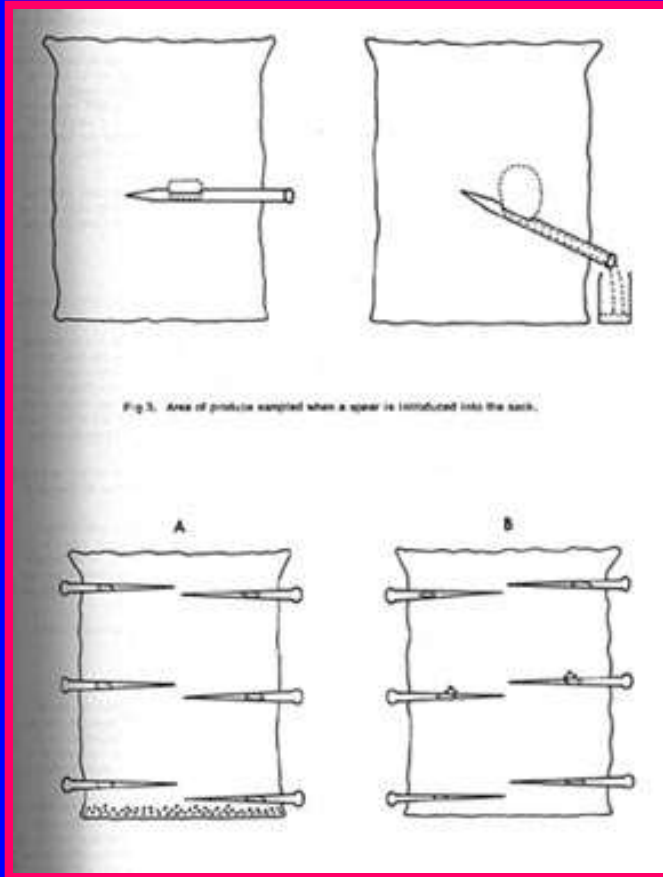
Vacuum probe for
bulk-stored grain

- ❖ Torpedo (spear) sampler
- ❖ Sieving (check efficiency)
- ❖ Boerner divider and other dividers (sample reduction)
- ❖ Insectomat

Bagged Grain

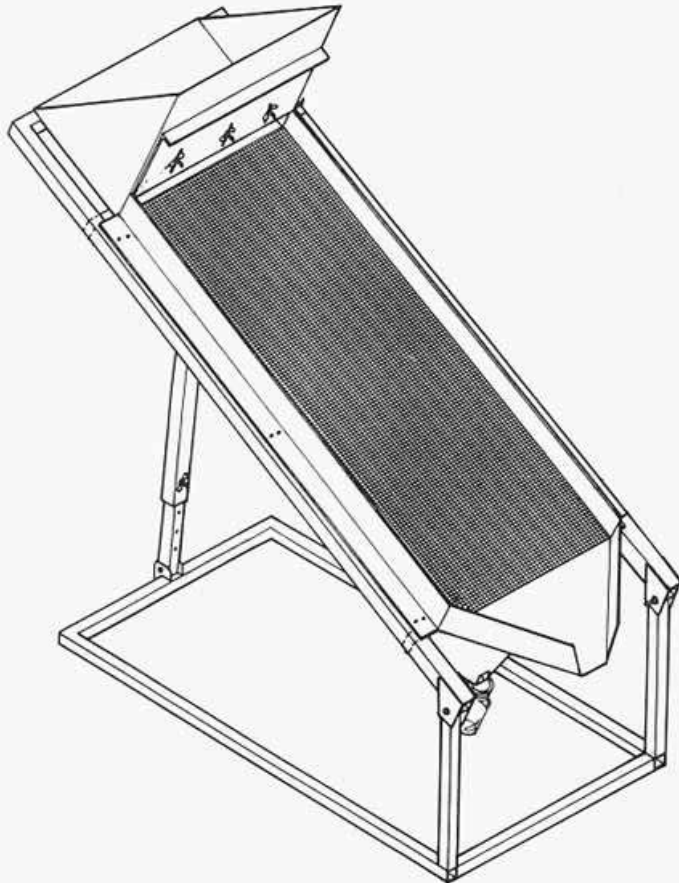


Torpedo Samplers



Sieve Samplers

Inclined
sieve



Boerner Dividers



Insectomat

- ❖ Capable of processing large samples
- ❖ Pass grain sample twice for extraction of all insects present (need to check efficiency in separating insects from grain)



Absolute Estimates ...

- Should be more reliable
- Pest management decision should be based on absolute estimates

Relative Estimates (Traps)

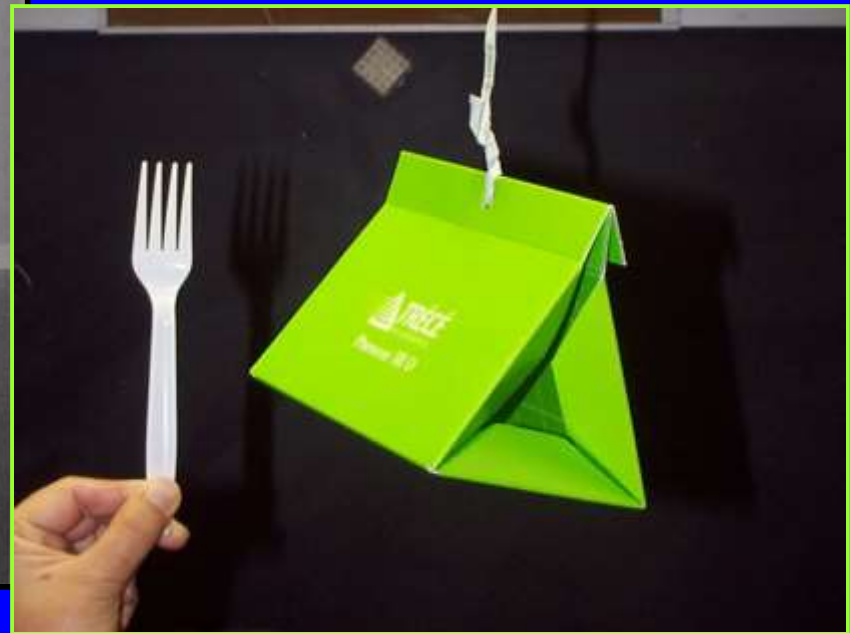
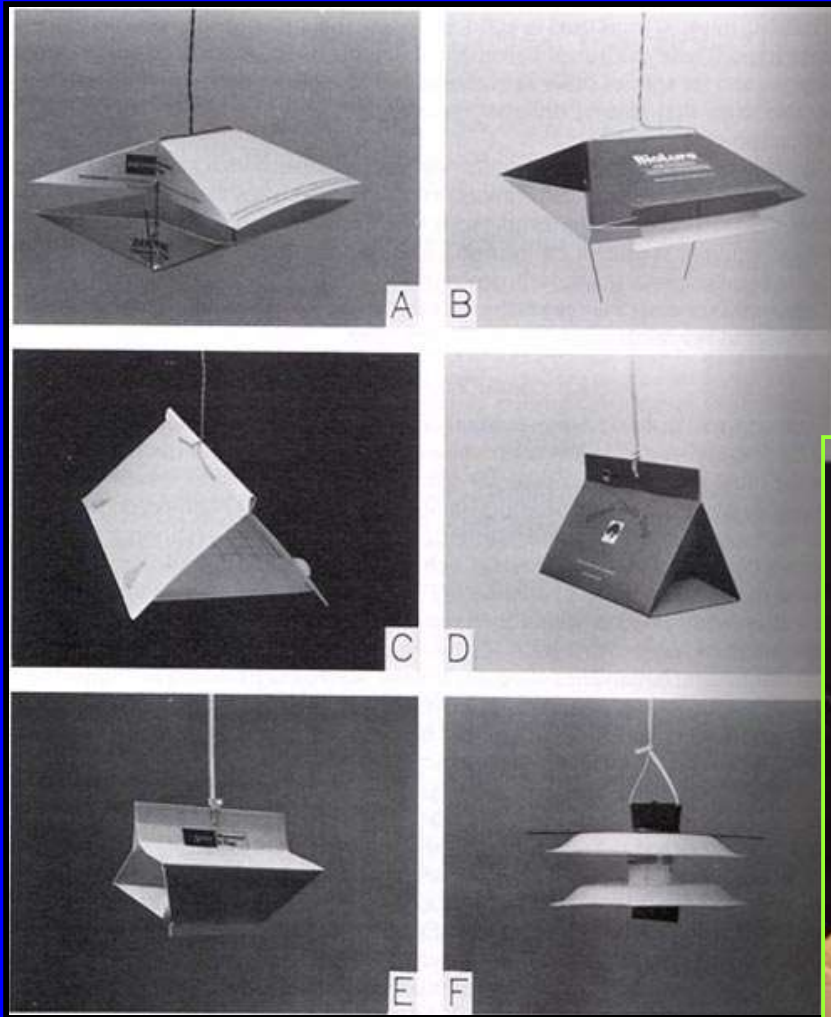
- ❖ Number of insects found in a trap constitutes a relative estimate
- ❖ There are many trap types

For flying insects

For Crawling insects

For flying insects

Sticky traps



Pheromone traps



Pherocon II traps

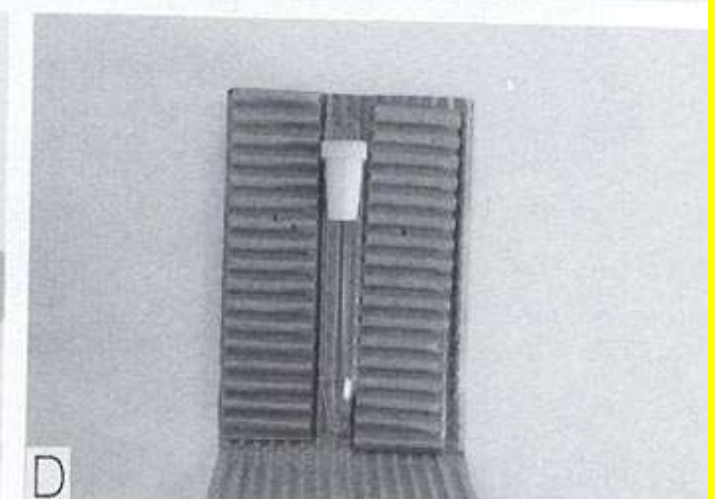
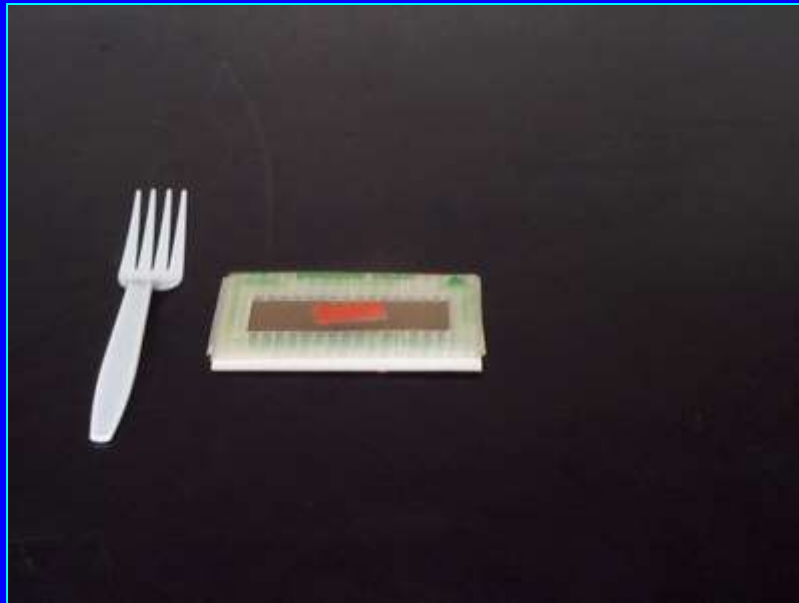


Pheromone lure

Traps for Crawling Insects

- ❖ Provides a hiding place
- ❖ Includes various designs
- ❖ Can be used with pheromone lures or food baits to enhance capture of species
- ❖ Can capture multiple species
 - ❖ Corrugated Harborage Traps
 - ❖ Corrugated Paper Traps
 - ❖ Bait-Bag Traps
 - ❖ Food-baited Traps

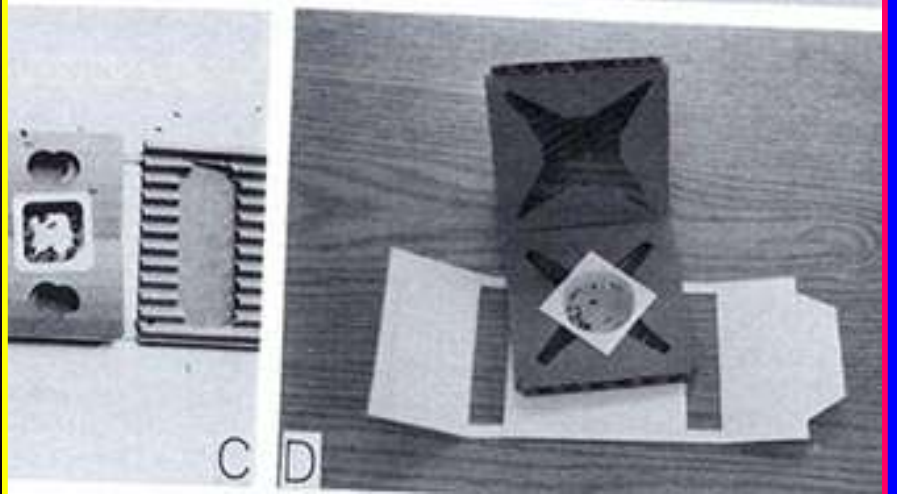
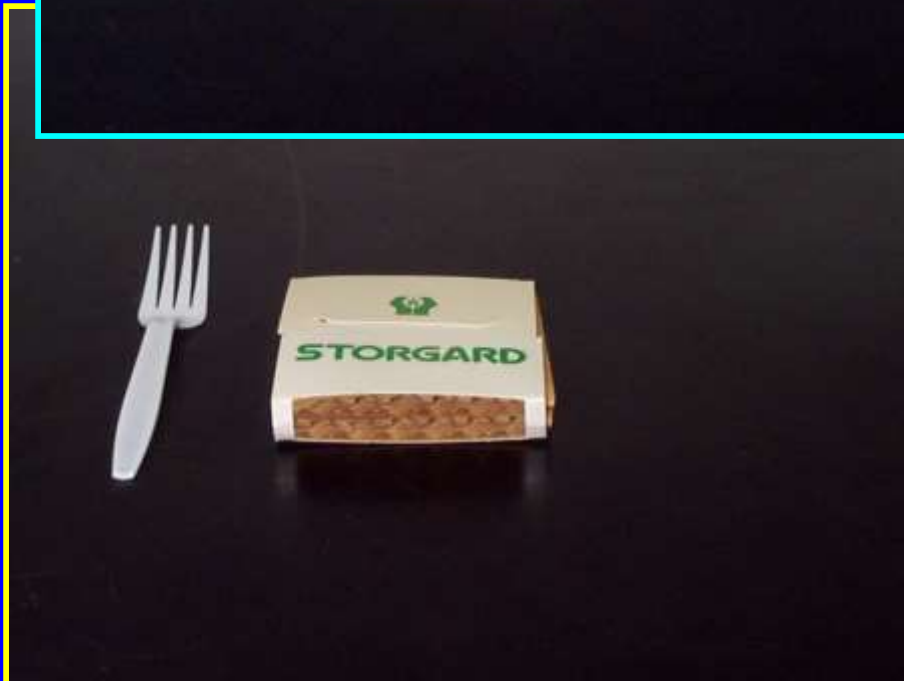
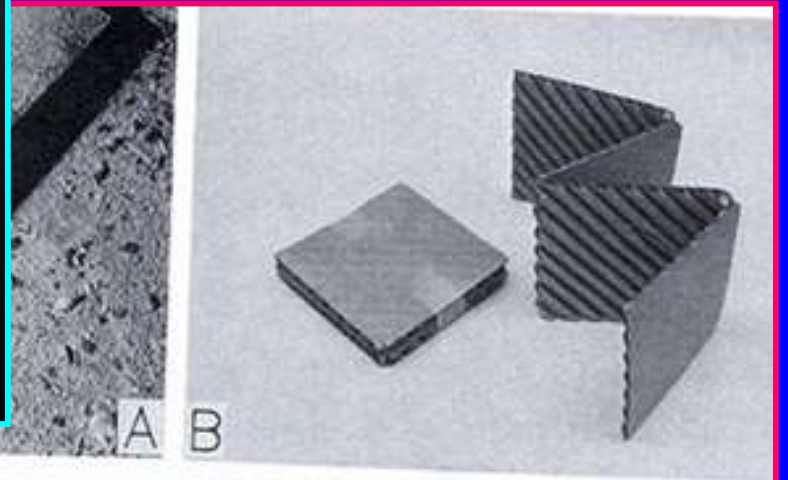
Corrugated Harborage Traps



A B

C D

Corrugated Paper Traps



Bait-Bag Traps



Netlon netting (8x16 cm)
Aperture 2 mm
Brown rice-60 gram





Food-baited Traps



Pitfall Cone Trap

- ❖ 95 mm x 125 mm cone-shaped with holes
- ❖ Very sensitive
- ❖ For surface area of the grain bulk

Take Home Points

- ❖ Take more samples than fewer samples
- ❖ More than 10 and less than 30
- ❖ Information from sampling can be used into computer programs to make pest management decisions
- ❖ Without proper detection and monitoring of insects you will treating more number of times than needed or fail to treat when you really need to!