Critters in the Bin
What now?

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Cereal Resea


Over 100 species of insects can breed or survive in grain based products

General characteristics

- Over 90% are beetles/ some moth species
- Destroy over 5% (10%) of world production of grains in storage
- Cosmopolitan (Found in tomb of King Tut)
- Generation time of 4-6 weeks at summer temps

  2-3 generations/ year in Wisconsin

  10-12 in tropics and indoors

Primary pests- (internal feeders)

- Attack whole grain
- 5-8 species
- Most are beetles
- Can be most serious
- 1 pair of granary weevils will have 675million offspring in 6 months


Primary Pest of Grain

Granary Weevil

- Can not fly as an adult
- 200-400 eggs per female
- Live several months
- 4 week life cycle in summer
- Popcorn, rice, whole wheat, bird seed

Secondary pests- (External feeders)

- Attack broken grain and fines, processed food- expanded to all types of dried plant materials
- 40 -50 species
- Most do not fly must be brought in (animal feed?)


Red Flour beetles


University of Nebraska
Department of Entomology


RED FLOUR BEETLE


University of Nebraska
Department of Entomology


e here.

Indian Meal Moth

- Most common infestation in processed goods
- Corn ,popcorn,soybeans
- Resistance to Malathion
- Only infests surface(12 inches) but webbing causes major problems


DDVP- vapona strips

Secondary pests- (External feeders)

- Running grain through cleaner to remove broken grain, fines, dead insects, etc will help

3rd group-Fungus feeding insects

- Feed on mold and mildew
- Many can fly
- Cause spoilage (heating)- more mold
- 15 species
- Still get docked as infested
- Most commonly seen in lab-80% samples

Fungus feeders

- Large group of insects that feed on mold and decaying grains
- Many look similar to some of the secondary pests
- Many can fly-Treatment including fumigation **not** a long term solution
- Need to change the environment-lower moisture- TURN ON THE FANS


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Mold mites

Grading of corn, oats , barely

- Presence of any 2 live weevils or
- 1 live weevil and 5 other live insects injurious to stored grain or 10 other live insects injurious to SG per 1,000 grams =

INFESTED

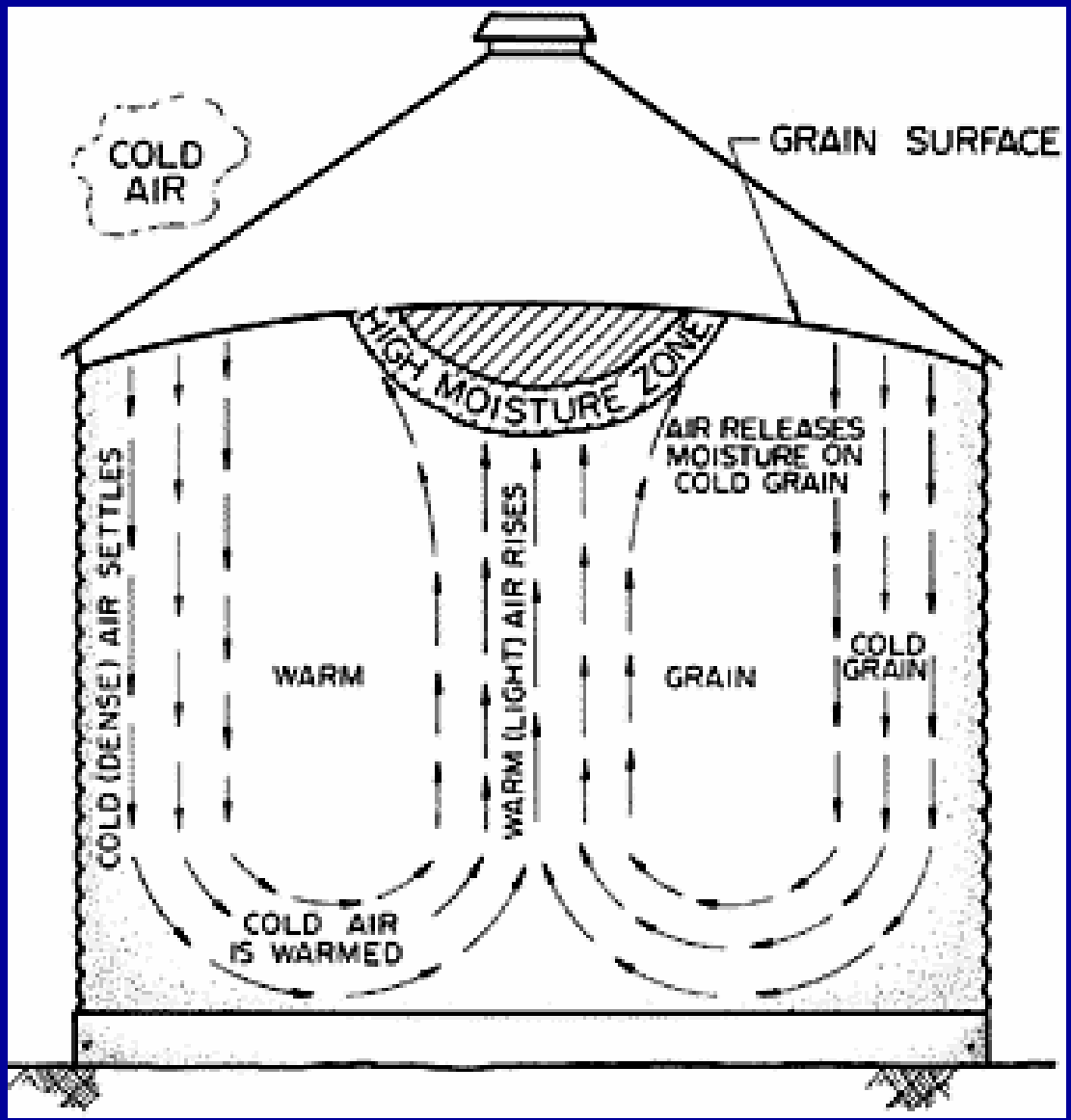
WEEVILY

Grading of wheat, rye

- Presence of any live weevil or
- 1 live weevil and 2 other live insects injurious to stored grain or
- 2 other live insects injurious to SG per 1,000 grams

INFESTED

Mold problems


COLD AIR
GRAIN SURFACE
HIGH MOISTURE ZONE
AIR RELEASES MOISTURE ON COLD GRAIN
COLD (DENSE) AIR SETTLES
WARM (LIGHT) AIR RISES
WARM
GRAIN
COLD GRAIN
COLD AIR IS WARMED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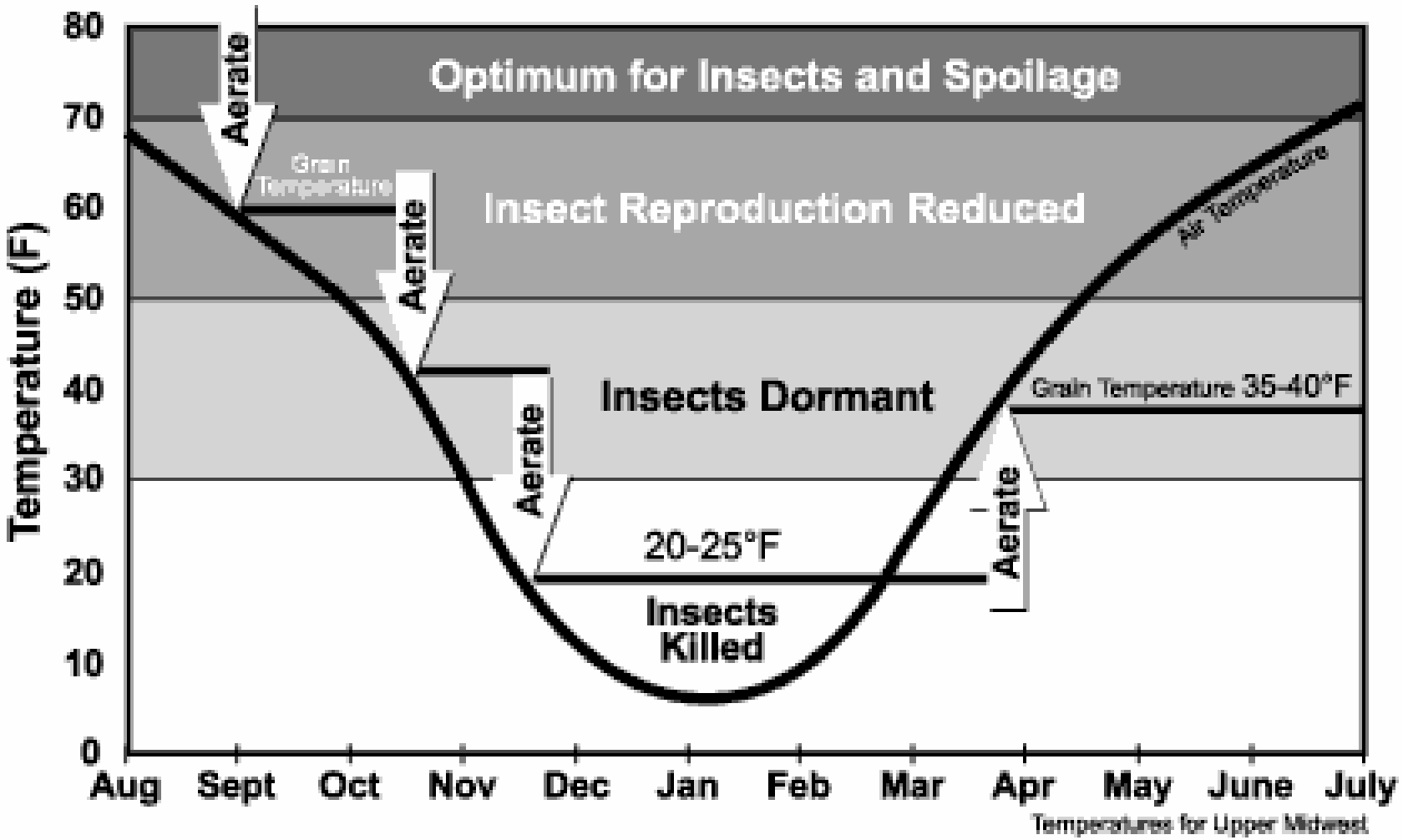
Cool Grain to Prevent Storage Problems



* Prevent crusting due to moisture migration by cooling grain to within 15°F of average outdoor temperatures.
* Cooling grain by 10°F doubles its allowable storage time

Dr. Kenneth J. Hellevang, PE
NDSU Extension Service

Table 2. Storage moisture contents for aerated grain

	Corn	Beans	Wheat	sunflower
Short term*	15.5	13%	14%	11%
One year	14	12	13	10
Long term	13	11	13	9

*Short term means until the following June.

Six Rules of Stored Grain

- Prevention
- Good sanitation
- Proper storage
- Ventilation-aeration
- Monitoring
- Select proper control

Clean bin and equipment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Insecticides- Empty Bin

- Storicide II
- Tempo-WP on concrete
- Insecto dust (DE)- below floors
- Malathion 2 EC
- Or Fumigate below slotted drying floors- with cloropicrin (heavier than air)

Store clean, dry grain

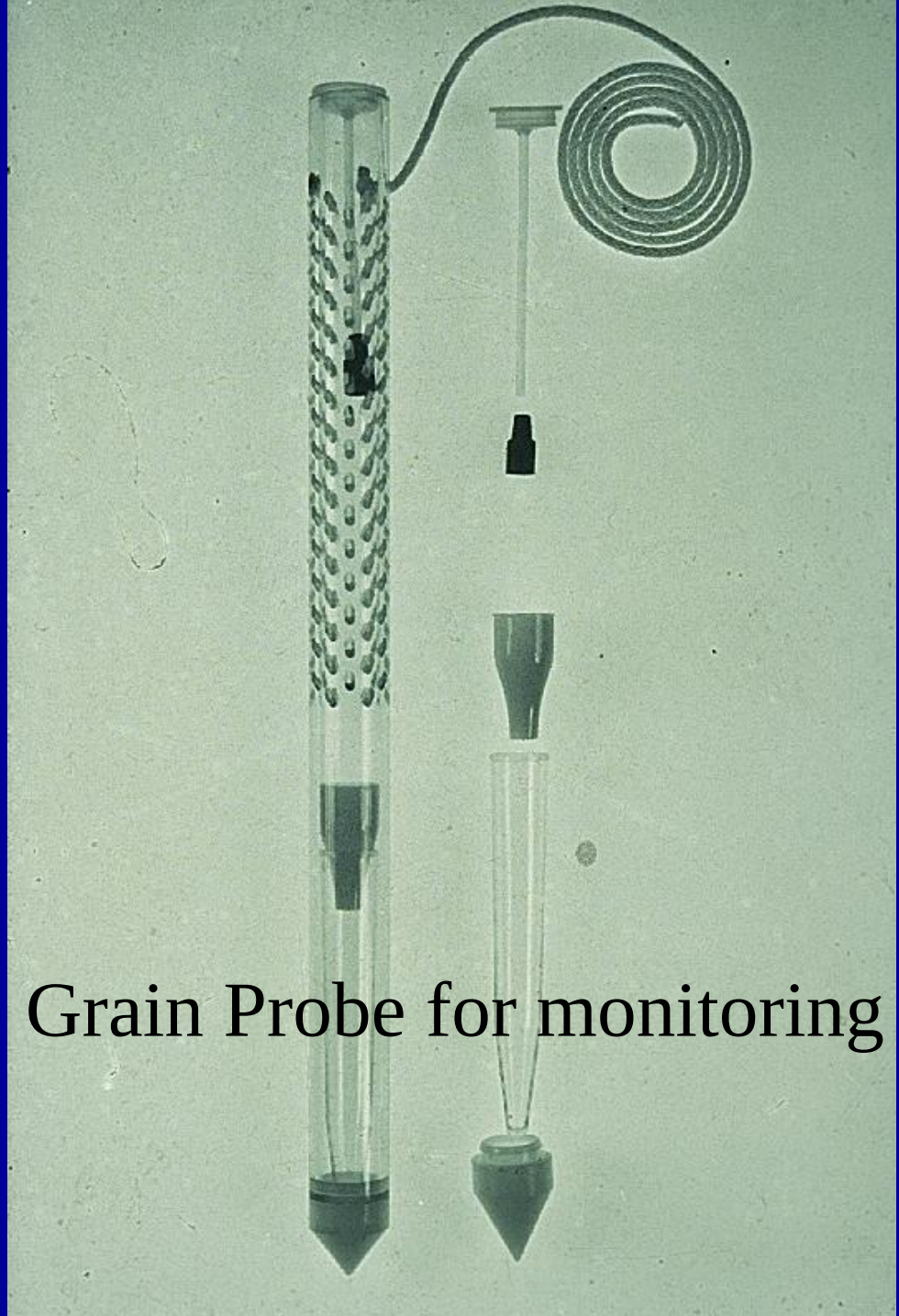
- DO NOT MIX NEW AND OLD CROP
- Broken grains and fines will support insects and prevent air movement- cleaning helps

Pest Management means monitoring

Inspect regularly

Every 2-3 weeks in summer

One an month in cool season



Grain Probe for monitoring

Insects per trap week above which discounts occur. (Oklahoma State University)

Species	Threshold levels / week
Rusty grain beetle	3,000 - 5,000
Rice weevil	5
Red flour beetles	1,000

If you have insect problems

- Treating surface will not work
- Need to move grain and treat it all
- Chemicals will not work well at low temperature
- Get the insects ID to figure proper treatment

Grain Treatments

- B.t.- Dipel Thuricide, Bactospeine) corn, wheat , soybeans- INDIAN MEAL MOTH
- Actellic- corn
- Malathion- corn , wheat , barley
- Reldan -wheat- DISTCONTINUED
- Storicide II-wheat ,barely,oats rye

Grain treatments- continued

- DE - (Insecto) Corn, wheat soybeans
- Diacon II (methoprene) growth regulator- All grains , bird seed- does not kill adult insects
- DDVP- Vapona- resin strips for space over grain (Indian Meal moth adults)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DE or Silca dust
1mm 15.0kV 328E1 0256/01 SE


DE-Diatomaceous earth or silica dioxide
Could have grading issues
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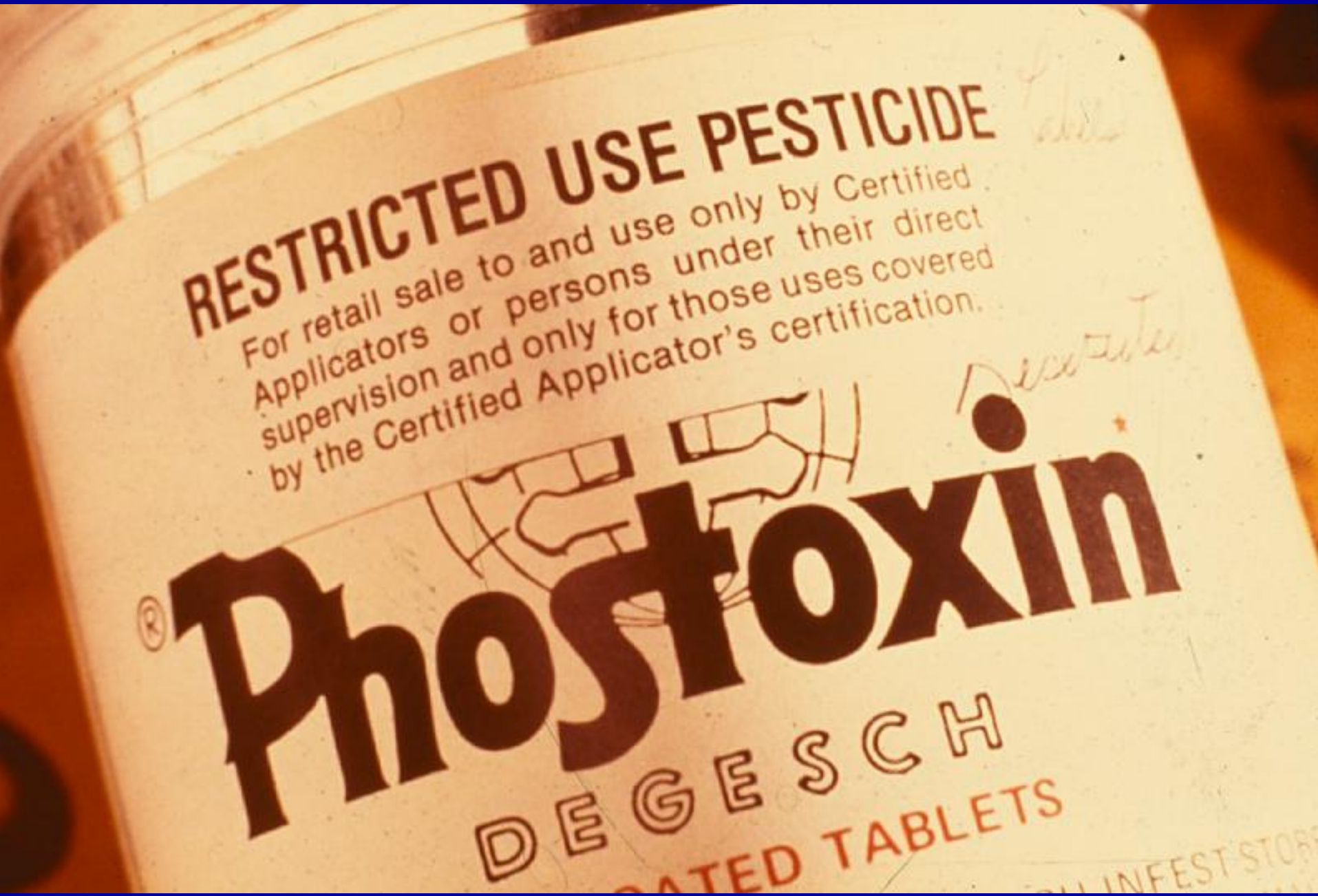
Fumigants

- Aluminum Phosphide-Deltia, Phostoxin, Phostek
- Methyl Bromide- need to recirculate
- Magnesium Phosphide - ?
- Carbon dioxide- Need special equipment and air tight bins

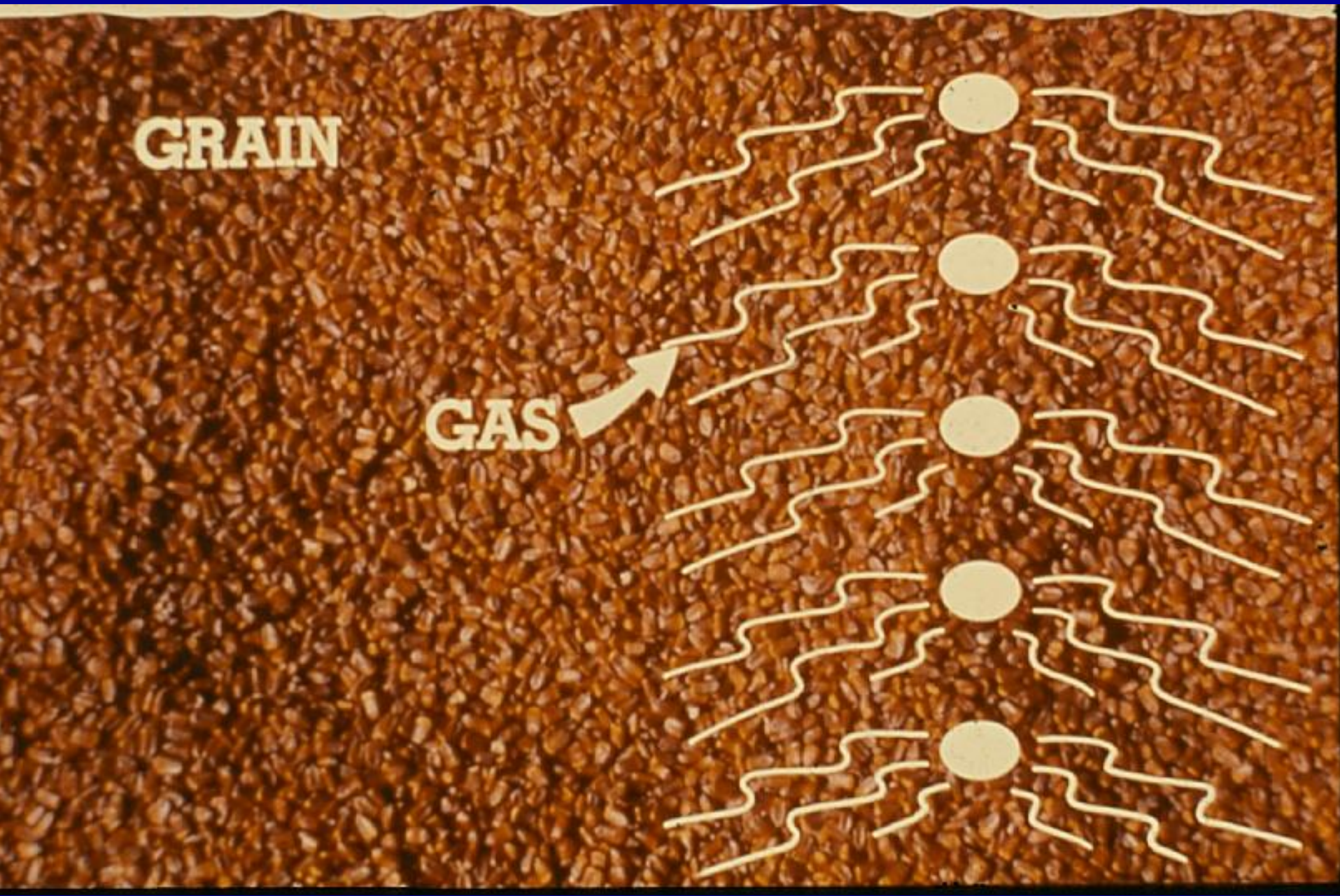

RESTRICTED USE PESTICIDE
For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.
®Phostoxin
DEGESCH
TABLETS

Fumigation

- Requires special certification
- Labels require special equipment for use
- Best to hire a professional applicator

Phosphine gas

- Phostoxin, Detia Fumitoxin , Phostek, Gastoxin


GRAIN
GAS

Fumigation

- Grain should always be level in the bin to let the fumigant penetrate evenly.
- Any surface caking or crusting should be broken up and removed.
- Grain temperature should be 60°F or higher to ensure proper vaporization.
- Possible leak points such as cracks or holes in the bin should be closed since leakage will result in under treatment and poor control.

Last comments

- New crop in empty bin will be OK till next spring
- Do not wait until fall to find out you have a problem
- Proper aeration is the most important long term insect control
- Find out what insects are in bin before treating

The end