STORED - PRODUCT INSECTS:

“INTEGRATED PEST MANAGEMENT – A RESEARCHER’S VIEW”

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“INTEGRATED PEST MANAGEMENT – A RESEARCHER’S VIEW”

View IPM as the best possible management strategy, with the realization that at this time it is not used in most stored-product situations.

Specialty and organic markets have some degree of IPM.
STORAGE PESTS AND DAMAGE
INSECTS CAN FIND FOOD!!
HEAVILY-DAMAGED WHEAT:
HOW TO PREVENT THIS?
What is IPM exactly?
MONTANA BULK GRAIN EXAMPLE

Low insect numbers

Penalty for presence of live insects

IDK rare

*Similar to low insect tolerances in processing and warehouses
SECONDARY PEST – MOST COMMON INSECT IN MONTANA GRAIN

Rusty grain beetle
NEWLY-FILLED BINS CONTAIN A WARM, CONCENTRATED SUPPLY OF FOOD
FIRST STEP

SANITATION

SPIRLED GRAIN, OR GRAIN RESIDUE

AS LITTLE AS ½ CUP CAN BE A SOURCE OF PROBLEMS, QUICKLY!
CLEAN THE EMPTY BIN WELL
CLEAN UP

1. AUGUR
2. TRUCK
3. SPILLS
4. COMBINE
5. FEED AREA
SECOND STEP

COMMODITY PROTECTION

ENSURE THAT GRAIN IS STORED AT 12% MOISTURE CONTENT OR LESS

TREAT WITH CHEMICAL OR D.E. PROTECTANT
CONVENTIONAL PROTECTANT

GUSTAFSON
RELDAH®
INSECTICIDE

ACTIVE INGREDIENTS:
Chlorpyrifos-methyl (0,0-dimethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate) ........ 43.2%
Xylene range aromatic solvent ................... 46.0%
INERT INGREDIENTS ............................. 10.8%
TOTAL ........................................ 100.0%
Contains 4 lb. chlorpyrifos-methyl per gallon

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
DANGER
Corrosive. Causes eye and skin damage or irritation. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Do not breathe vapors and spray mist. Keep container closed. Wash hands, arms and face thoroughly with soap and water after handling and before eating or smoking. Routinely shower or bathe after work and wash all clothing with soap and hot water before reusing. Keep away from food, feed stuffs and water supplies.

STATEMENT OF PRACTICAL TREATMENT
If Swallowed: Do not induce vomiting. Call a physician immediately.
If on Skin: Remove contaminated clothing and immediately wash with soap and water.
If in Eyes: Flush eyes with plenty of water for 15 minutes and call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos-methyl is a cholinesterase inhibitor. Treat symptomatically. Atropine by injection is the preferable antidote. Oximes such as Z-PAM may or may not be therapeutic, but it is recommended they not be used in place of atropine.

ENVIRONMENTAL HAZARDS
Gustafson RELDAN 4E insecticide is toxic to fish, birds and other wildlife. Do not apply directly to water. Do not discharge directly or indirectly into surface waters. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS
Combustible—Do Not Use or Store Near Heat or Open Flame.
Do Not Cut or Weld Container.

RELDAN is a Reg. TM of The Dow Chemical Company
U.S. Patent No. 3,244,586
EPA Est. No. 32761-MO-3
EPA Reg. No. 7501-41

Gustafson
1400 Preston Road
Plano, Texas 75093
EXAMPLE OF A D. E. PRODUCT

Grain Storage

Loses!

Protect-It™
The Natural Choice
STORED PRODUCT INSECTICIDE

Now there's effective protection!
EMPTY BIN ONLY!!

Specimen Label

Tempo® SC Ultra
Insecticide

For commercial use only

For broad-spectrum control of crawling, flying, and wood-feeding insect pests for indoor and outdoor surfaces, as well as insect pests of trees, landscape ornamentals and residential and commercial lawns.

ACTIVE INGREDIENT:
Cyprodinil 4-hydroxy-3-phenoxybenzyl isothiocyanate 3-(4,5-dichloro-2,2-diethylnylisocyanate) (DEIAC) 11.8%

INITIATIVE INGREDIENTS:
20.0%
100.0%

Contains 1.0 cyprodinil 4-hydroxy-3-phenoxy benzyl isothiocyanate 3-(4,5-dichloro-2,2-diethylnylisocyanate) DEIAC per gallon.

EPA Reg. No. 3125-458

Six 240-mL Bottles per Case, Two Cases per Case

STOP - Read The Label Before Use
KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Harmful if absorbed through skin or inhaled. Causes moderate eye irritation. Avoid contact with eyes, skin or clothing. Wash long sleeved shirt and long pants, socks and shoes. Chemical resistant gloves (such as nitrile butyl, Neoprene, and/or Butyl Laminates). Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash before reuse.

STATEMENTS OF PRACTICAL TREATMENT

If swallowed: Call physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by back of those with fingers, if possible. If unconscious, do not give anything by mouth and do not induce vomiting. If on skin: Wash with plenty of water. If symptoms persist, get medical attention. If intoxicated: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention. If in eyes: Flush eyes with plenty of water. Call a physician if irritation persists.

Note To Physician: No specific antidote is available. Treat the patient symptomatically.

ENVIRONMENTAL HAZARDS

This pesticide is extremely toxic to fish and aquatic invertebrates. Remove from premises prior to drift and contamination of surface water bodies. Do not contaminate surface or ground waters when disposing of equipment wash water. Do not contaminate water by applying to or where it may enter. Do not apply to areas where cattle and other livestock are present or to areas where surface water is present. Do not apply to areas where livestock or other domestic animals are present. Do not apply to areas where surface water is present or in areas where livestock or other domestic animals are present. Do not apply where livestock or other domestic animals are present. Do not apply when weather conditions favor drift to treated areas. Do not store in areas where livestock or other domestic animals are present.
THINGS TO AVOID!!

OVERFILLING THE BIN!!!

*MONITORING AND SAMPLING IS DIFFICULT IF BIN IS COMPLETELY FILLED
LEVEL THE GRAIN

1. ALLOWS FOR WORKER MOVEMENT

2. ALLOWS FOR MONITORING

3. ALLOWS FOR AIR EXCHANGE
MONITORING PEST POPULATIONS

Essential component of IPM
Allows for measurement of effectiveness

If economic threshold is exceeded,
Intervention (fumigation) is required
GRAIN PROBE TRAPS FOR MONITORING

Apparatus used
PROBE TRAPS FOR MONITORING
INSERTING GRAIN PROBE
WITH ROOM TO MOVE
THIRD STEP
TEMPERATURE CONTROL
USE AUTOMATIC AERATION TO COOL GRAIN RAPIDLY
PREVENTS INSECT REPRODUCTION
*REDUCES COSTS BY LOWERING PROBABILITY OF “PRESENCE” PENALTY
AERATION STUDY
Diagram showing trap locations.
3 H.P. TURBINE FAN – 3000 BUSHELS
AERATION DUCTING
FIXED TEMPERATURE CABLES
SOFTWARE TO MANAGE AERATION
WEATHER STATION FOR AERATION INPUT
**AERATION RESULTS FOR TWO YEARS**

**Power Average Core Grain Temperatures**
Between September 17 and November 17, 1999

**Moccasin Average Core Grain Temperatures**
Between September 2 and November 17, 1999

**Power Average Core Grain Temperatures**
Between August 28 and November 17, 2000

**Moccasin Average Core Grain Temperatures**
Between August 11 and November 17, 2000
TRAP CAPTURES 5/17 – 5/31, 2001
Rusty Grain Beetles - Moccasin, MT

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RESULTS

1. AERATION WAS EFFECTIVE

2. COSTS $0.02/bu.

3. UNAERATED BULK – PENALTY + FUMIGATION $0.10/bu.

*BUT WHY MONITOR?

*CAN’T YOU JUST AERATE?
ANSWER

TO SAVE MONEY!!

IF THE AERATION FAILED, THE GRAIN MIGHT BE REJECTED AT THE ELEVATOR.

THEN, ADDITIONAL COSTS FOR TRUCKING AND FUMIGATION COULD AMOUNT TO $0.15/bu.

IF AERATION FAILS, ON-SITE FUMIGATION BEFORE REJECTION ONLY COSTS $0.02/bu.

IF AERATION WORKS THERE ARE NO ADDITIONAL COSTS
SUMMARY

IPM is a good idea!!

This simple example shows that although the stored product environment often requires fixed inputs, the basic idea of monitoring to determine when action needs to be taken, and monitoring to evaluate the effectiveness of given procedures can be cost effective.

These concepts can be further applied to processing and milling facilities.

*More research needs to be conducted on developing and integrating management strategies.