Grain Treatment Programme Operator Training

Cooney Grain, Gorey, Co. Wexford.
12 July 2016

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Grain Treatment Programme Operator Training - Agenda

1. **Pre Harvest Preparations**
2. **Grain Storage**
    a) What is it
    b) What are the Risks
    c) Understanding the Risks
    d) Moisture/ Temperature Relationship
    e) Consequences of Bad Storage
3. **Grain Treatment Programme**
    a) Liquid Preservative
    b) Application and Application Systems
    c) Aeration and Ventilation
    d) On Going Monitoring
4. **Summary**

Pre Harvest Preparations

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Pre Harvest Preparations

Risk Assessment

HACCP Principles

Minimise/Eliminate Risks

Pre Harvest Preparations

- ✓ Repairs - Buildings, Equipment, Pipes/Ducts
- ✓ Cleaning - Bins, Stores, All Equipment.
- ✓ Disinfection - All areas.
- ✓ Calibration - Moisture Meters, Liquid Application, Intake Equipment
- ✓ Training - H&S, Operating Procedures
- ✓ Supplies - Liquid, Spare Parts, Recording,

Grain Storage

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Grain Storage - definition

Stored Grain is a Dynamic Ecosystem

in which

Living Organisms (Grain, Moulds, Mites, Insects)

interact with

Non Living Environment (Temperature, Moisture, Oxygen)

Grain Storage - what are the Risks?

- Heating
- Condensation
- Mould
- Bacteria
- Insects & Mites
- Birds & Rodents

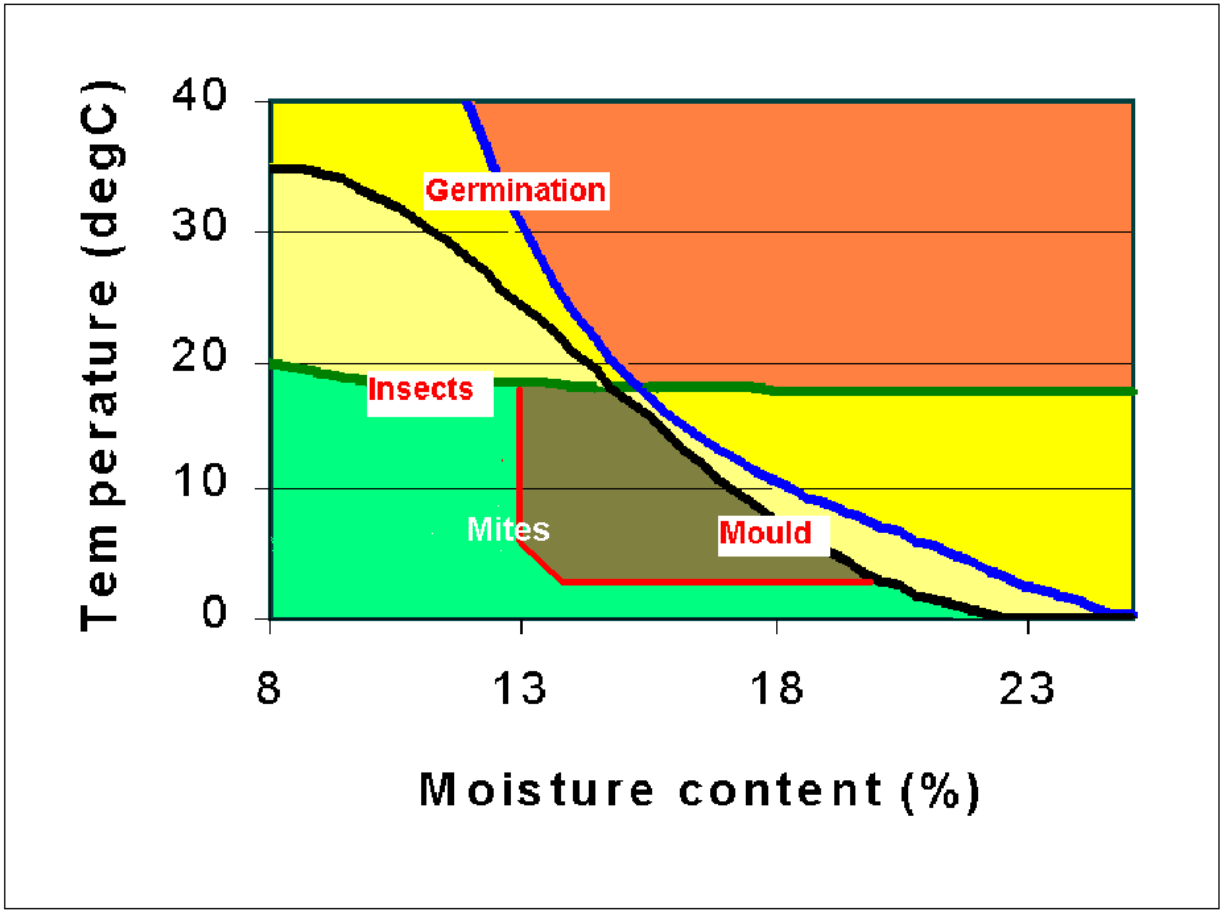
Grain Storage - understanding the Risks

- Heating - Respiration, Activity of other organisms
- Condensation - Moisture due to air temperature changes - causes “crusting”, damage to buildings
- Moulds - live and grow on the grain, degradation, produce Mycotoxins
- Bacteria - live and grow on the grain, degradation, produce Toxins
- Insects & Mites - eat the grain, cause heating, allergens
- Birds & Rodents - eat the grain, cause damage, spread disease.

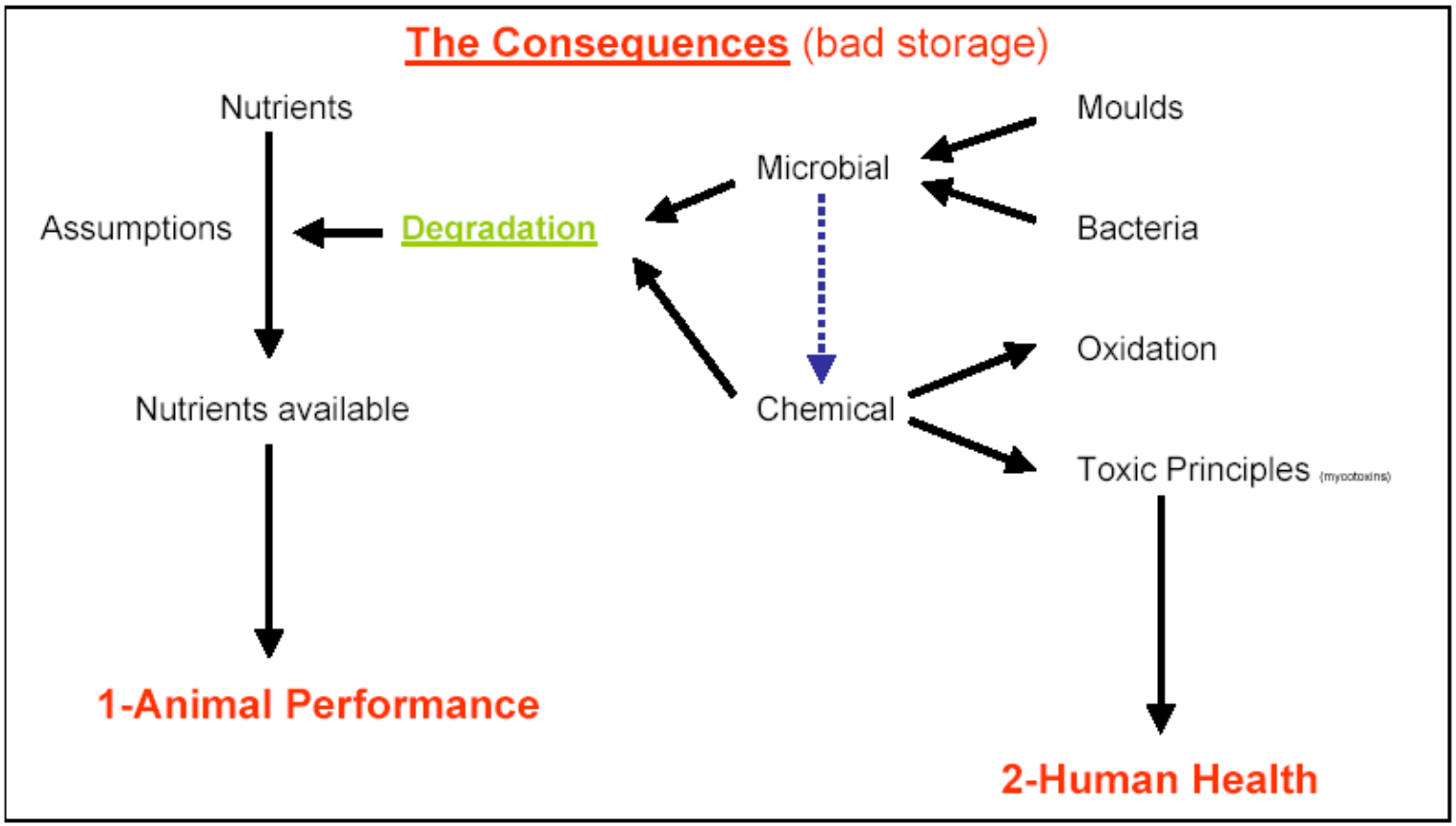
Grain Storage - Issues to consider

- Late Cut Grain - V. High Moisture. Ends up at the peak of the pile
- Carry over of Dust/Chaff at the end of the conveyor/store
- Resistance to airflow - air takes path of least resistance
- Crust forming in top layer - Happens when warm air rising in the pile condenses when it meets cold air at or just below the surface of the grain
- Warm air rising from the grain must be removed from the space above the grain otherwise it will condense.
- Can aerate when raining?

Grain Storage - Moisture/Temperature Relationship



Grain Storage - Consequences if unsafe



Grain Treatment Programme

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Grain Treatment Programme - What is it?

3 Stages

- Application of a Liquid Preservative
  (MycoCURB ES Liquid/MouldMaster)
- Aeration & Ventilation
- Monitoring during Storage

Grain Treatment Programme - Why is it done?

Mould Reduction and Inhibition

RAPID TREATMENT AFTER HARVESTING LEADS TO LARGE **INITIAL** REDUCTION IN TOTAL MOULD COUNT

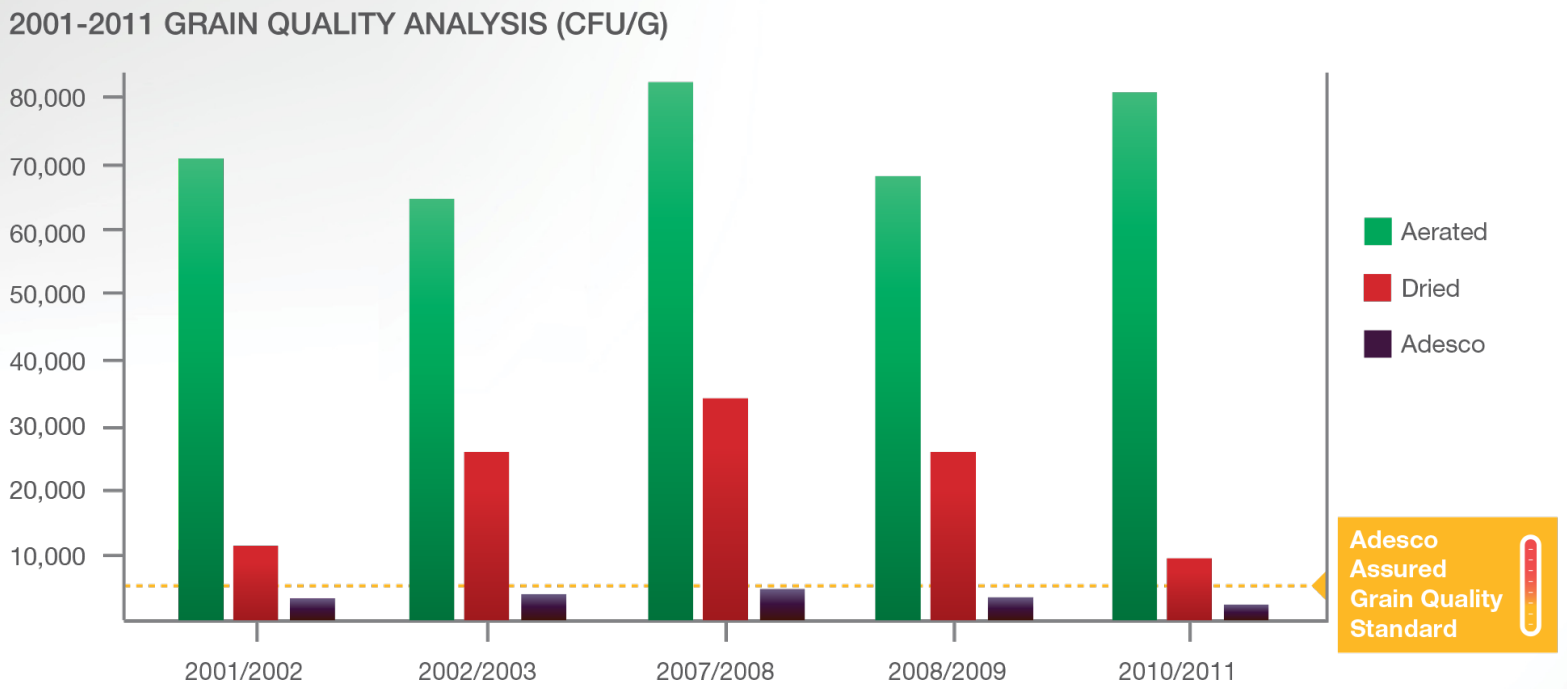
		Moisture	TMC
Sample 1	Green Grain A	17,0	49,000
	Treated Grain A	16,3	1,400
Sample 2	Green Grain B	17,0	31,000
	Treated Grain B	17,5	600
Sample 3	Green Grain C	23,7	550,000
	Treated Grain C	22,4	200

Grain Treatment Programme - Why is it done?

Mould Inhibition throughout Storage

GRAIN QUALITY TRENDS 2001 – 2011

QUALITY COMPARISON OF AERATED, DRIED AND ADESCO TREATED GRAIN



Source: Adesco Database

Grain Treatment Programme - Liquid Preservative

MycoCURB ES Liquid/ MouldMaster Liquid

- Mould Inhibitor & Active against Mites
- High Level of Active Ingredients >75%
- Contains 2% Surfactant
- Safe for Operators and Equipment
- High Efficacy at low application rates
- Broad Spectrum Usage
- Low Volatility

Grain Treatment Programme - Liquid Application

- Equipment Throughput check (Winter vs. Spring Barley)
- Application Equipment - Service & Calibration Report
- Operator Training - Correct settings
- Moisture Measurement - Separate Piles
- Sensors, Controls & Alarms working
- Good Mixing
- Recording - Sample record sheet review

Grain Treatment Programme - Liquid Application

1 objective

Grain Treatment Programme - Liquid Application

Distribution

Mixing

Control

Grain Treatment Programme - Application Chart

Application rates for Adesco grain preservation

More Powerful. More Flexible.

Adesco **Myco**CURB® ES is proven at up to 24% moisture

MOISTURE% (UP TO)	MycoCURB® ES kilos/tonne*	
	Up to 4 months	4 to 12 months
15%	0.50	1.00
16%	1.00	2.00
17%	2.00	3.00
18%	3.00	4.00
19%	3.75	4.75
20%	4.50	5.50
21%	5.50	6.50
22%	6.50	7.50
23%	7.50	8.50
24%	9.00	10.00
24% AND ABOVE	NOT RECOMMENDED	NOT RECOMMENDED

*Individual usage rates should be discussed with your Adesco Representative.

Application System Service and Calibration

Grain Treatment Programme - Record Sheet

GRAIN TREATMENT DAILY RECORD SHEET								INTAKE RATE			
TYPE OF GRAIN								BARLEY (TPH)	WHEAT (TPH)	BEANS(TPH)	
LIQUID PRODUCT											
Date	Time	Grain Moisture %	App Rate/ tonne	Pump Setting	Product Meter Reading			Grain Treated (Tonnes)	Calculated Av. Rate/ Tonne		
					Start	Finish	Usage				
Comments / Signature								Product Opening Stock (T)			
								Product Closing Stock (T)			

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Aeration and Ventilation

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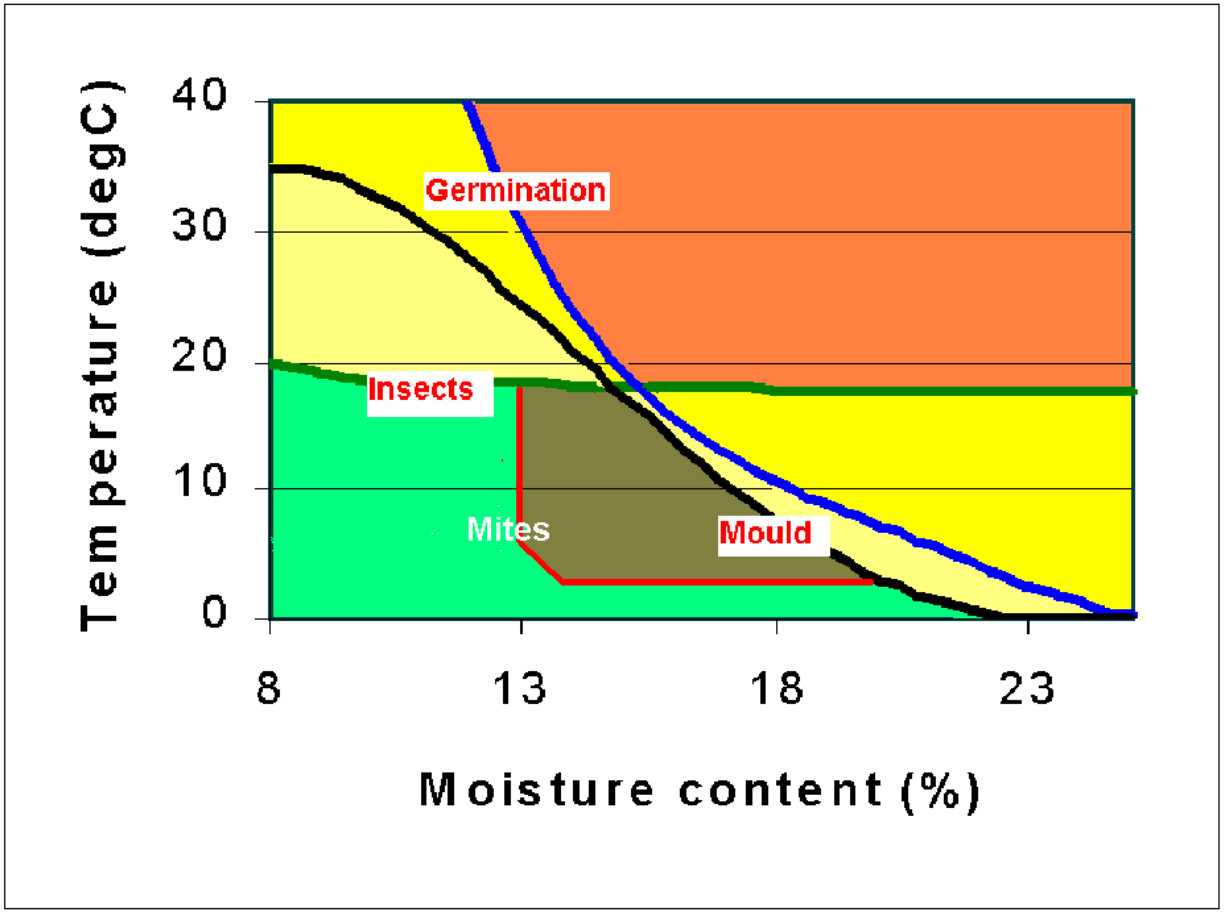
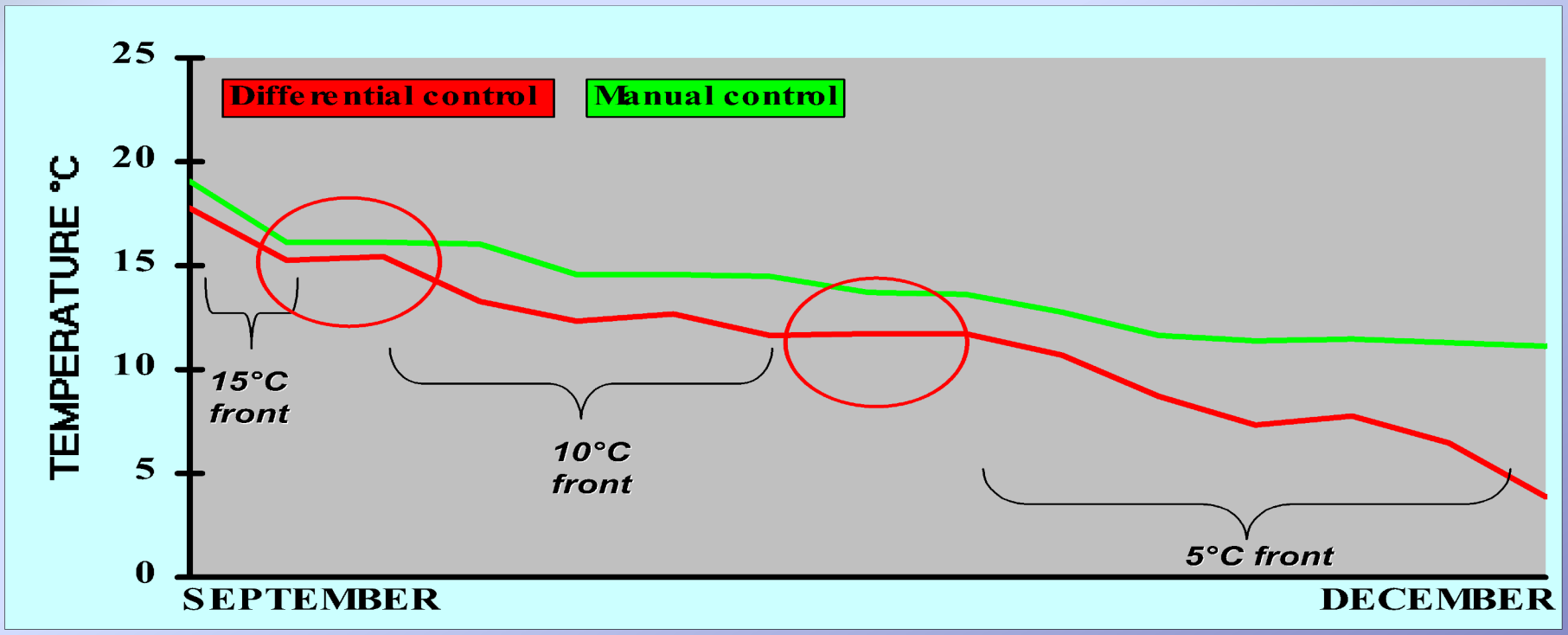
Aeration & Ventilation - Moisture/Temperature Relationship



Aeration & Ventilation - Cooling Fronts

Cooling targets



Aeration & Ventilation

Aeration - Essential to reduce grain temperature to prevent insect growth.

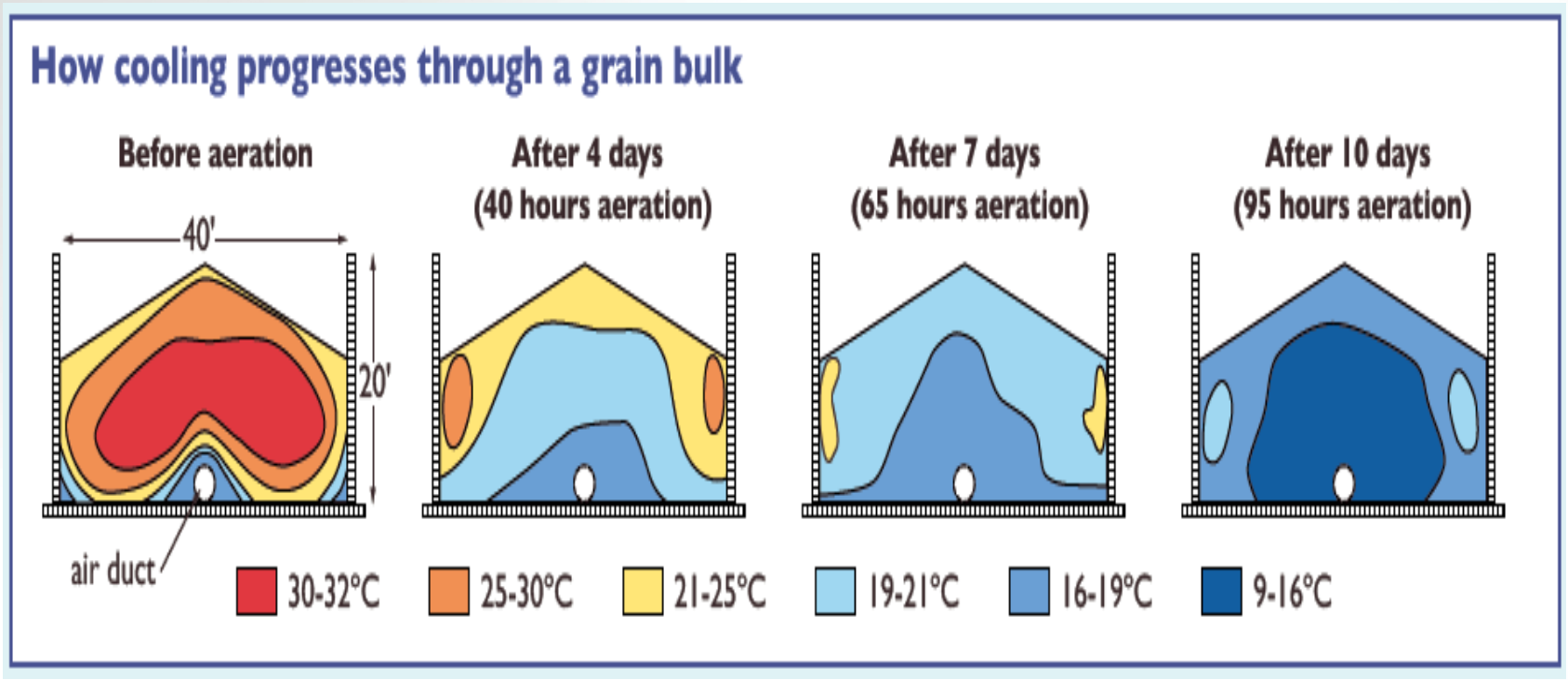
Some common insects need temperatures above 21°C to breed - other less common ones can breed down at 12°C

Grain Temperature Reduction

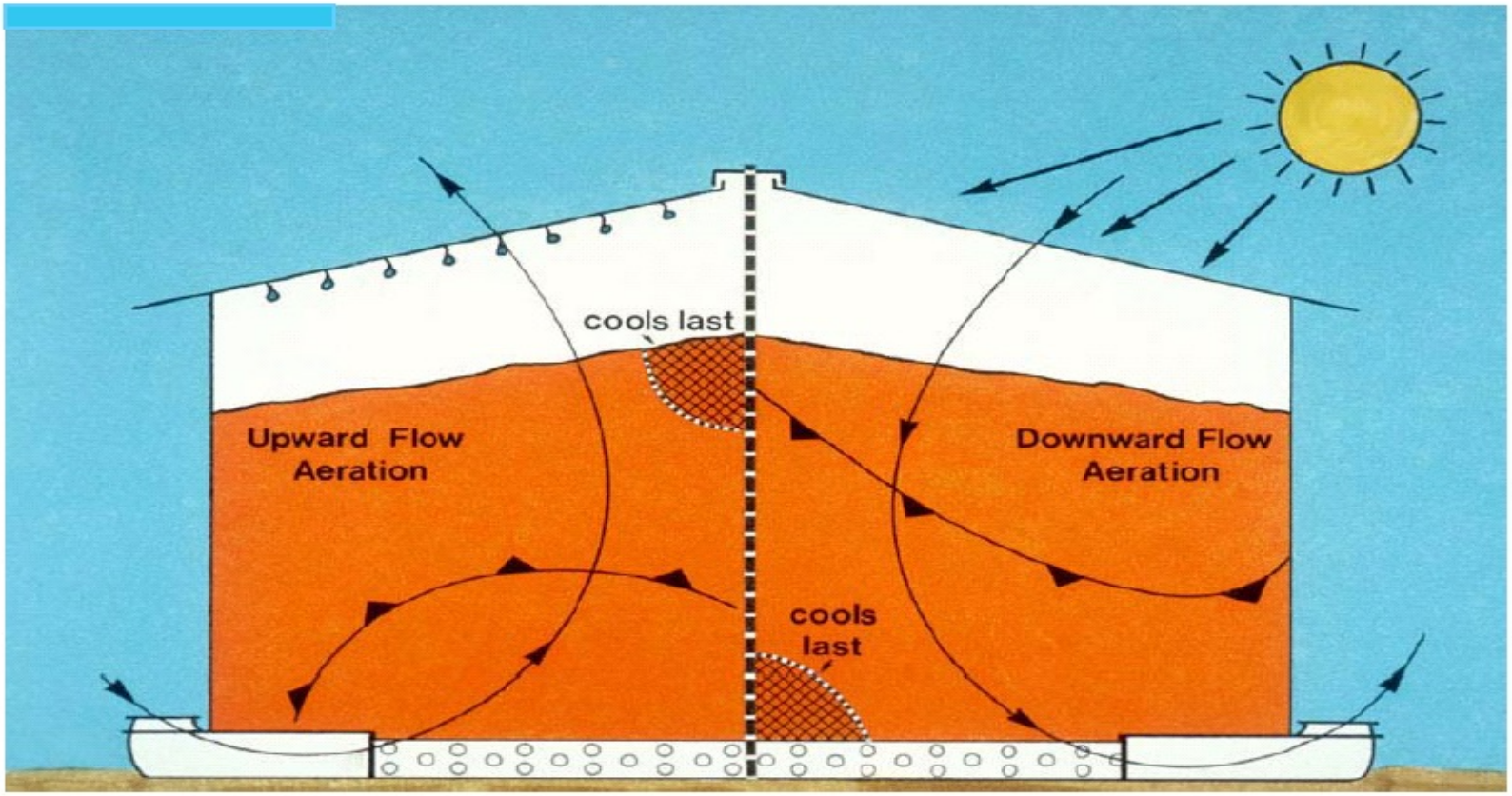
1st Target < 15°C after 2-4 weeks

2nd Target < 10°C after 4-6 weeks

Aeration & Ventilation



Grain Treatment - Aeration & Ventilation



Aeration & Ventilation - Design

Aeration - Good design is ESSENTIAL

- Amount of air required /tonne
- Air Speed
- Type of Fan
- Fan Capacity
- Duct/Pipe Capacity
- Duct/Pipe Spacing
- Height of grain
- Method of Filling

Aeration & Ventilation - Design

Aeration & Ventilation - Operation

Aeration - Good Operation is VITAL

- Start Early- Cover ducts, Block Pipes
- Air/Grain Temperature Difference – at Least 4° C
- Don't let temperature of the grain go above 25° C
- Remember Targets

  1st Target - Grain Temp. <15°C after 2 - 4 weeks

  2nd Target - Grain Temp. <10°C after 4 - 6 weeks
- Aerating at Night
- Differential Control
- Air Extraction

Aeration & Ventilation - Operation

Ventilation

- Warm air rising from the grain must be removed from the space above the grain otherwise condensation will occur on roof sheeting etc.
- Extraction fan capacity = to aeration fan(s) capacity.
- Try and keep the air temperature in the roof space above the grain the same as the outside air temperature.
- Need open area at opposite end of the store to let air in when running ventilation fan (especially if Aeration fans are not running)

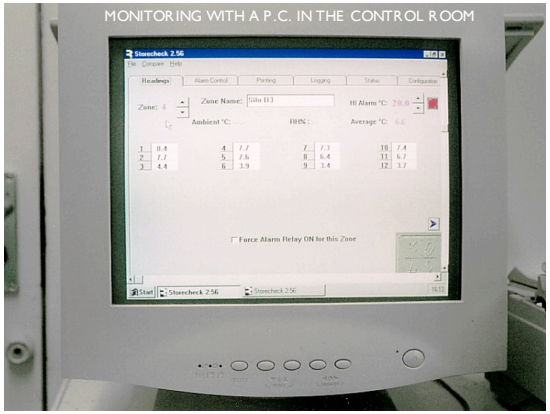
Aeration & Ventilation - Ongoing monitoring

- Monitor Grain Temperatures- Daily, Weekly, Bi Weekly, Monthly
- Temperature Probes- Positioning Important in sloped pile
- Visual Inspection- Temperature Probing
- Remember Targets

  1st Target - Grain Temp. <15°C after 2 - 4 weeks

  2nd Target - Grain Temp. <10°C after 4 - 6 weeks
- Records

Advantage Programme - Monitoring During Storage



Summary

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Grain Treatment Programme - Summary

- Get ready for the harvest in time - Repairs, Cleaning, Supplies Calibrations, Training
- Apply the liquid - Accurate, Consistent and Uniform
- Record what has happened - Grain in , Moistures, Liquid used etc
- Start Aeration Early
- Monitor Temperatures Regularly and Record
- Achieve Target Temperatures
- Aerate and Ventilate
- Adesco will support you

Grain Treatment - Summary

- Ask for help (early) if you sense a problem.
- Adesco will visit to support during and after harvest.
- Adesco will take temperatures and inspect the grain.
- Adesco will take samples and analyse for Moistures, Mould Counts, Enterobacteria etc. - FREE of CHARGE