Grain Quality – Things to Remember when Storing/Handling Grain

2016 WABA Crop Management Conference

Nick Friant, Cargill

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“Come to me early with a problem and you will have a partner in finding a solution. Come to me late with a disaster and you will have a judge.”

- James Preston, Avon

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Grain Quality Tenets

Adapted from Charles Hurburgh as published in Grain Journal

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Grain quality never gets better

Aeration will not correct incomplete or non-uniform drying

Moisture is the most important factor you measure

There is no “silver bullet” for monitoring/ managing grain in storage

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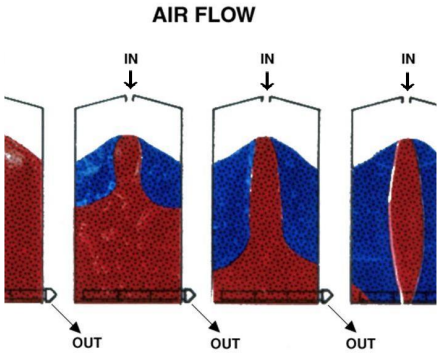
Poor quality grain is more costly to handle and store



If you do not grade/inspect all of your inbound grain, you cannot know what you have in storage

Many aeration problems can be eliminated by coring bins

Grain that has gone out of condition will always be a storage risk

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Pre-Harvest Plan

BINNING PLAN	• Space utilization • Quality • Carry • To pile, or not to pile	
STORAGE MONITORING PLAN	• What tools • Who? • How often	
GROUND PILES	• Tarps • Walls • Reclaim plans	• Monitoring • Quality • Licensing
LOAD OUT	• Ownership and obligations • Available Space • Inbound Grain Expectations (Quantity & Quality) • Outbound Grain Expectations (Quantity & Quality) • Special treatment (drying, cleaning, fumigating)	
CONTINGENCY???	• Quality issues • Freight issue • Weather	

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A Savings Plan

- Save one hundred dollars a month

A better savings plan

- Max out Roth IRA contributions
- 15% into the 401(k)
- Balance checking account weekly
- Review bank/credit card statements on monthly basis
- Review IRA and 401(k) statements on quarterly basis
- Review credit report/score annually
- Ask spouse about inconsistencies/unusual line items
- Report cases of fraud to bank/credit company/ brokerage firm

Storage Monitoring Plans

- Storage space = bank vault
- Today, a million bushels of soybeans in a tank is worth about $9,000,000
  - Was it worth $9myn three months ago?
  - Will it be worth $9myn in three months?
  - Should it be worth $9myn in three months?

Storage Monitoring Plans

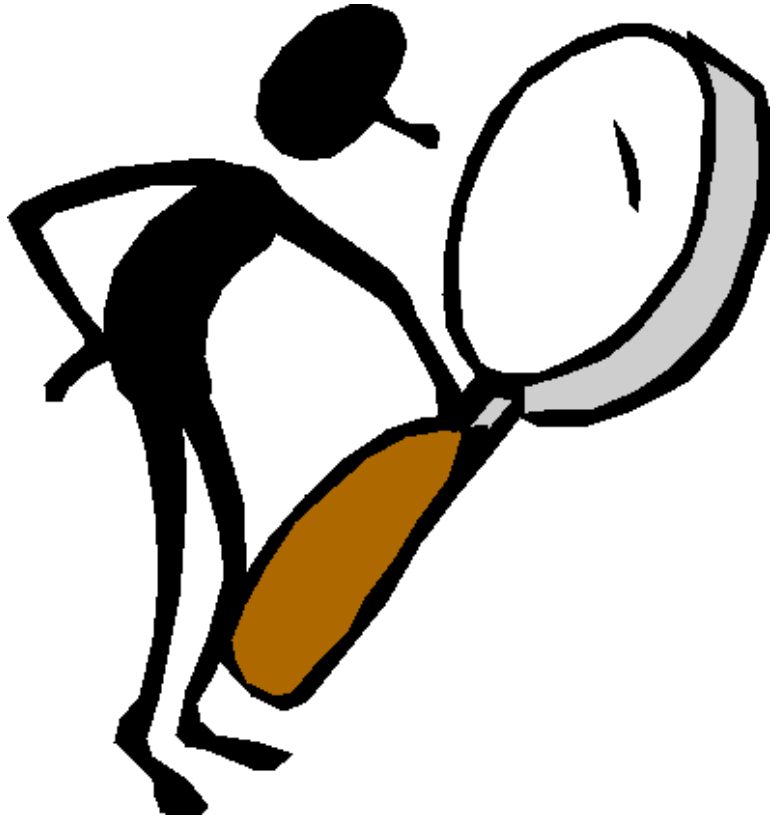
- Every one is going to be different
- The more detail and precision, the better
- Take into account changes in storage plans
- Does your plan include communication
- Are security considerations included

Monitor **I**nform **A**ct

Key components of managing grain quality

What are the tools?

- Temp cables
- Deep probing
  - Grading samples
- CO_2 monitoring
- Your five senses
- Grain Storage & Monitoring Plan



Who do you tell?

Have you had a discussion with your team about:

- What they should be communicating
- Who they should be telling
- How often they should be communicating

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How do you act?

- You already have acted by telling someone about the problem
- Turn the grain
- Fumigate
- Load out
- Ozonate
- Dry
- Aerate

DON'T HIDE IT!!!

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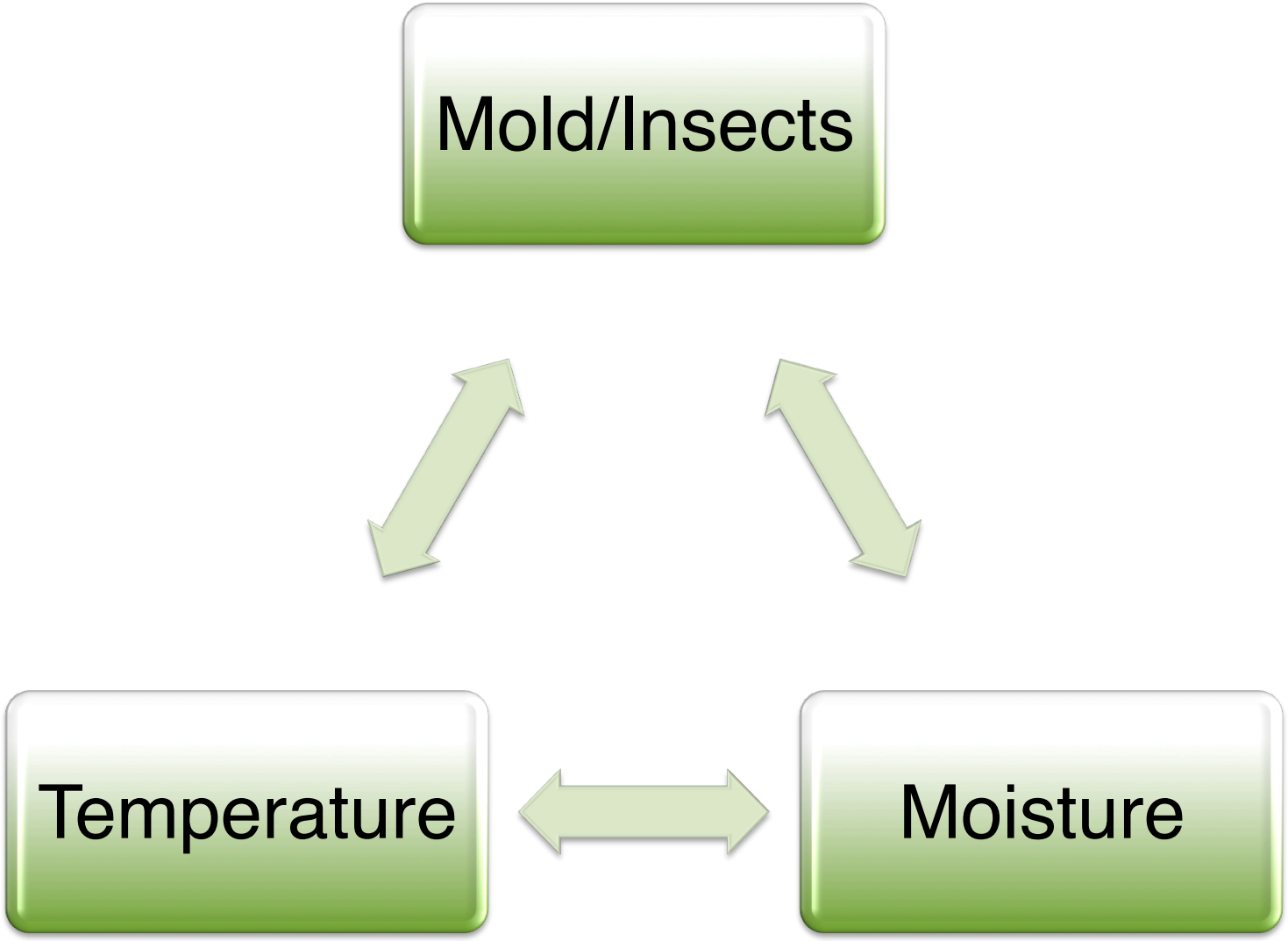

GRAIN

BECOMES

MOLDY

RESULTING IN

WATER

HEAT

CO_2

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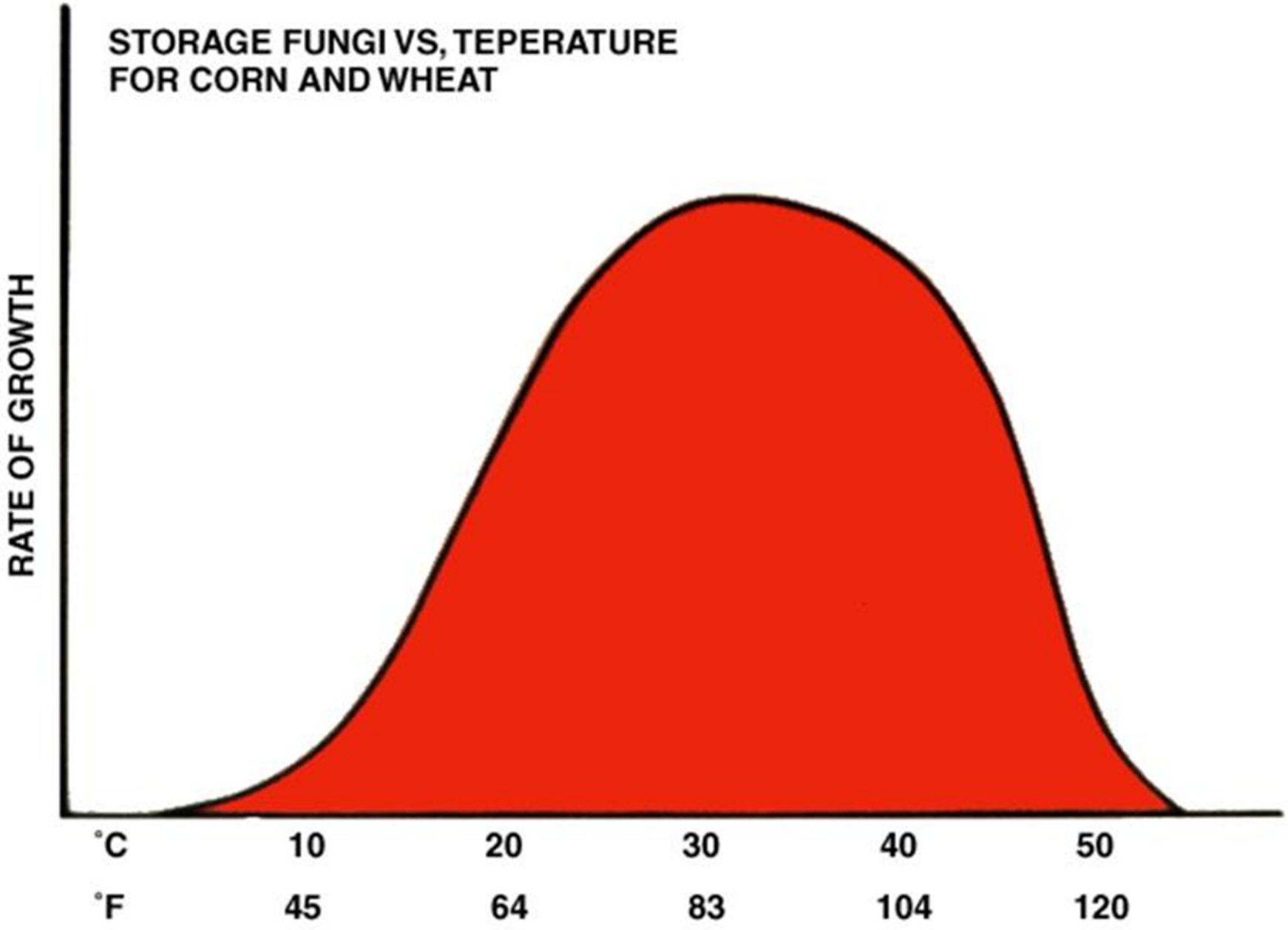
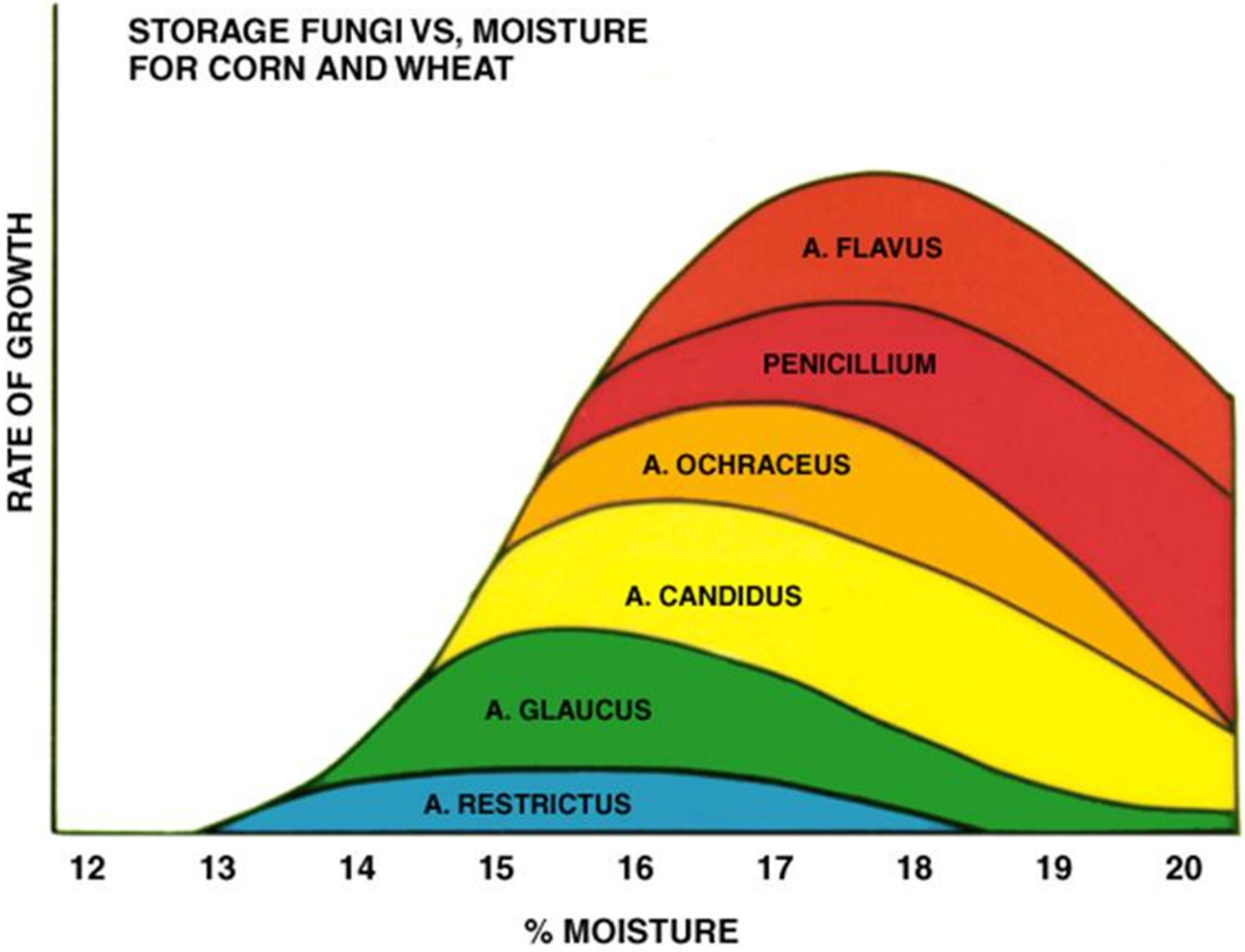
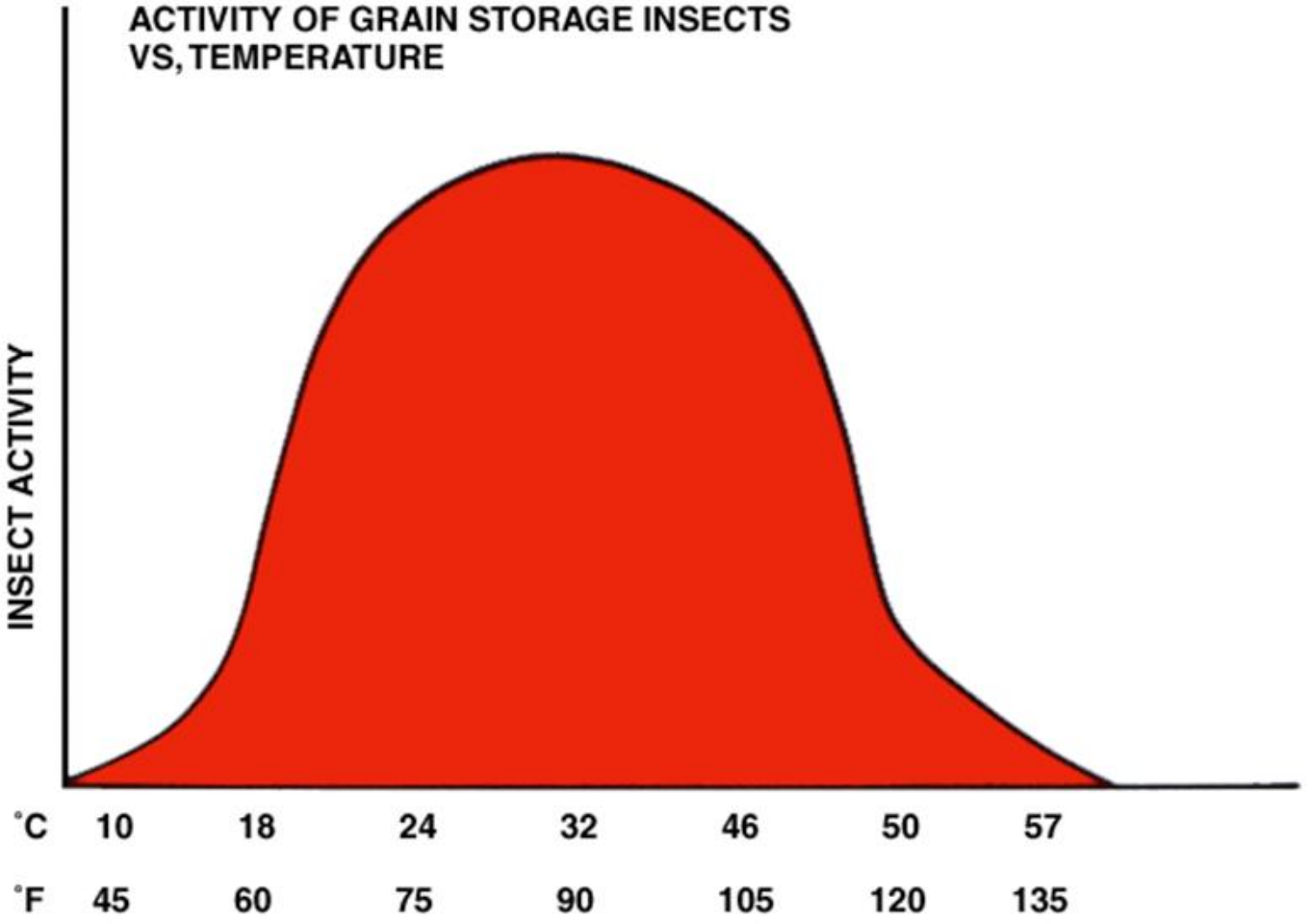
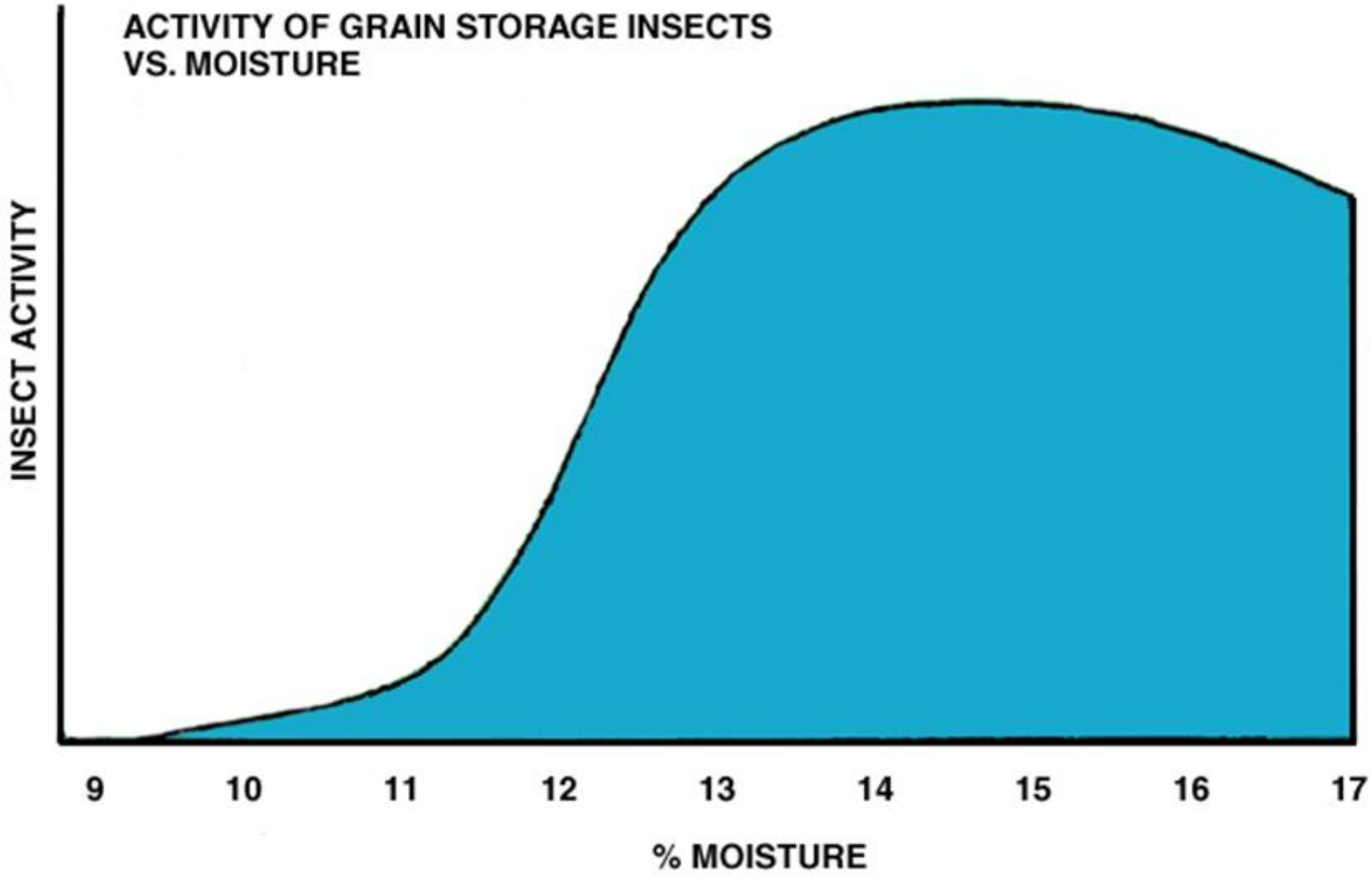




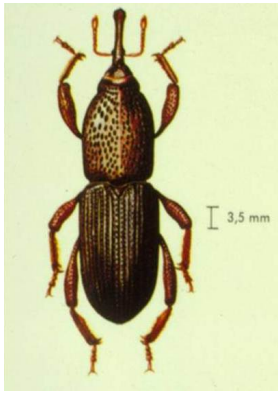


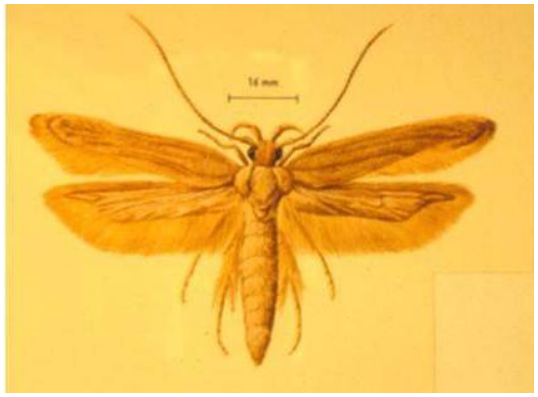


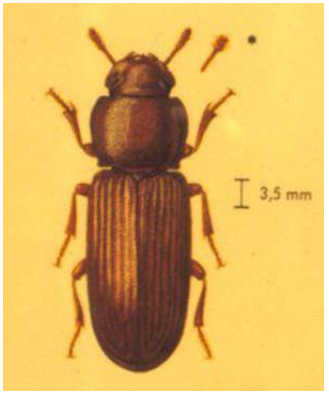
Why is identification important?

- Some are tourists

- Some are non-important
- Some controls may not work
- Maintain profitability







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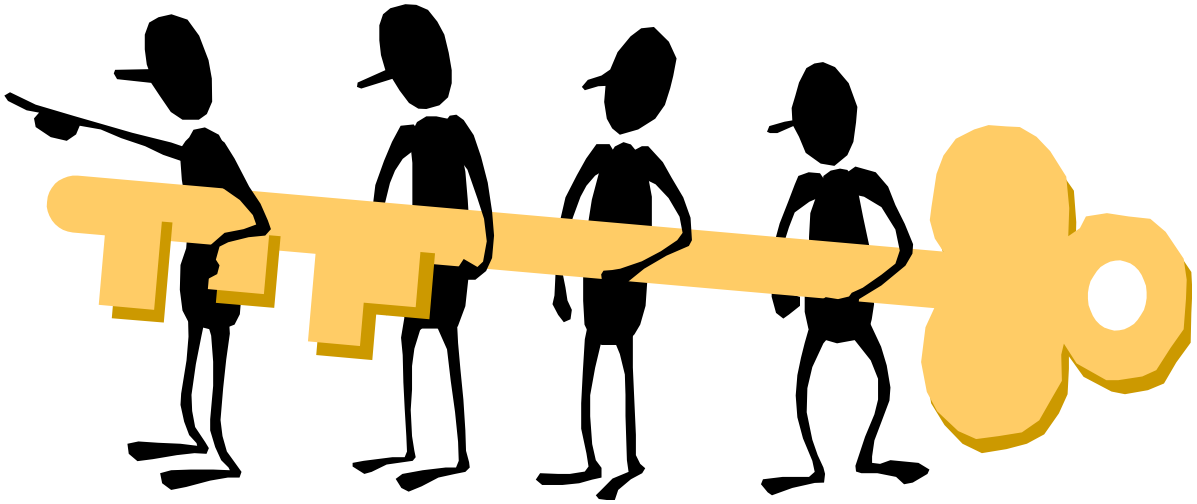
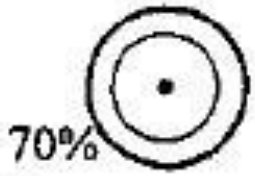
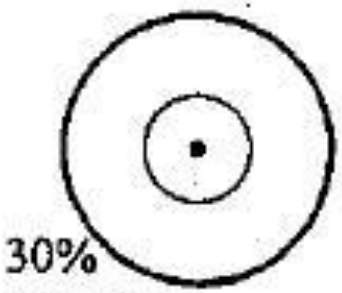
Tool Examples

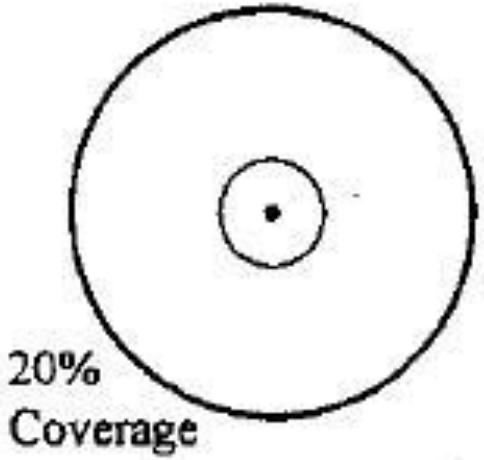


Temperature Cable Installation

Single Cable

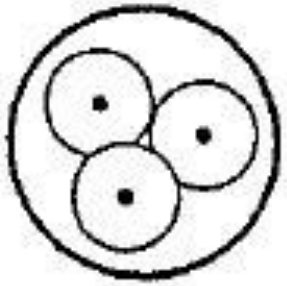


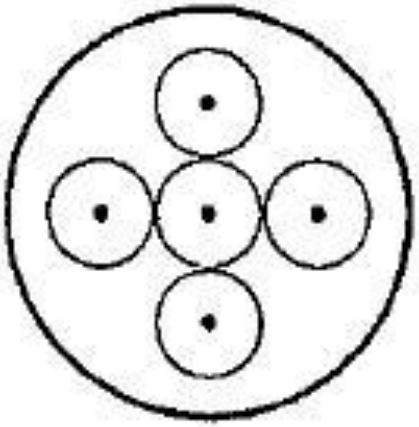




24’ 36’ 42’

Multi-Cable





Deep Probing

- Lay out a pattern to probe
- Probe as deep as possible
- Probe every 30 days
  - Safe to do so
  - In compliance with confined space entry policy
- Grade samples

CO_2 Monitoring

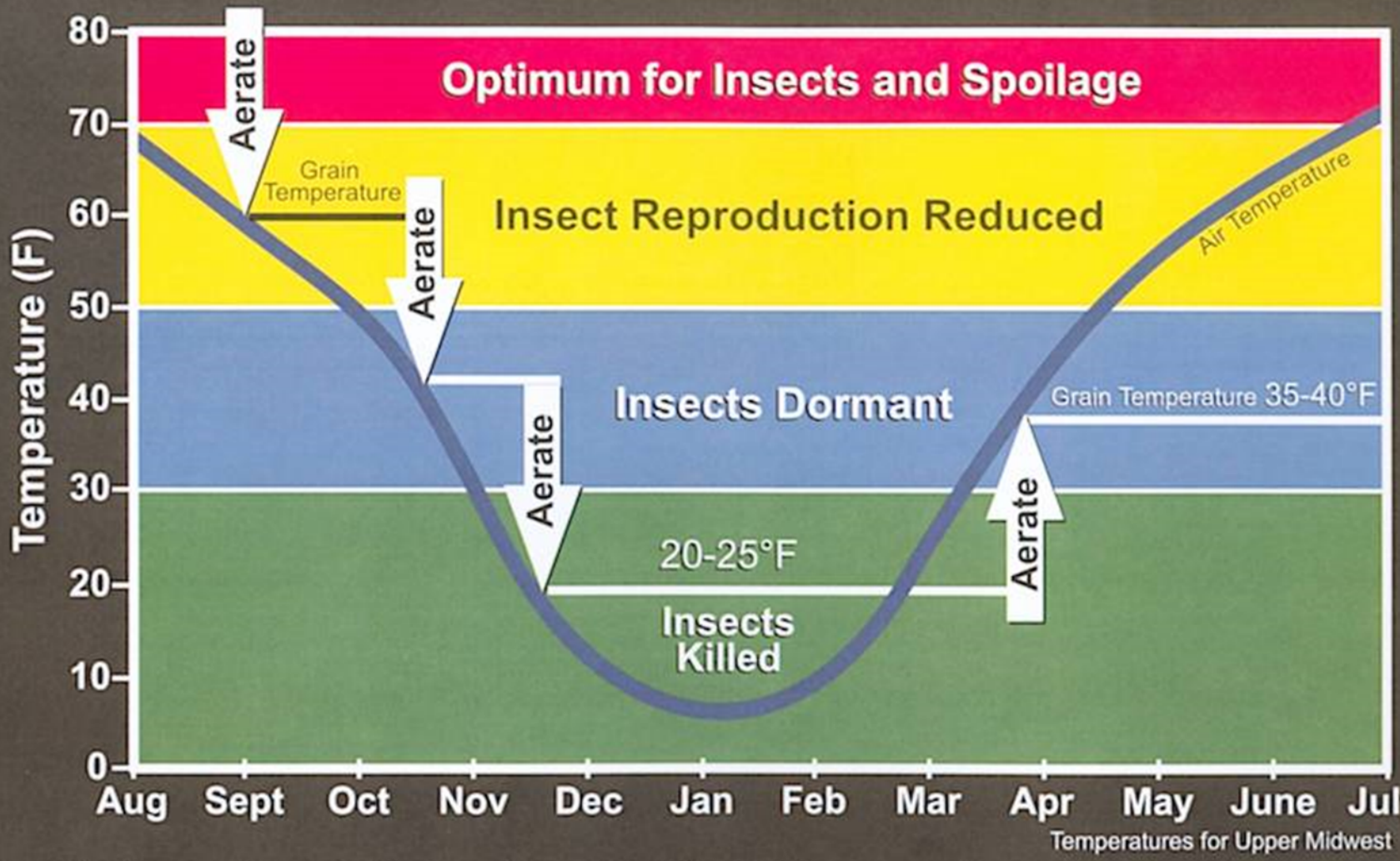
- Monitor carbon dioxide from fan exhaust and correlate to damage
- Hold monitor 2 – 4 feet from fan exhaust
- Watch for
  - Steadily increasing readings
  - Large jumps CO_2

Cooling and Warming

HOW COLD IS TOO COLD?
TO WARM, OR NOT TO WARM?

- Cooling grain below 35 - 40°F adds little value
  - Insect activity
  - Mold growth
- Get it cold, keep it cold
- Know your market

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, P
NDSU Extension Service

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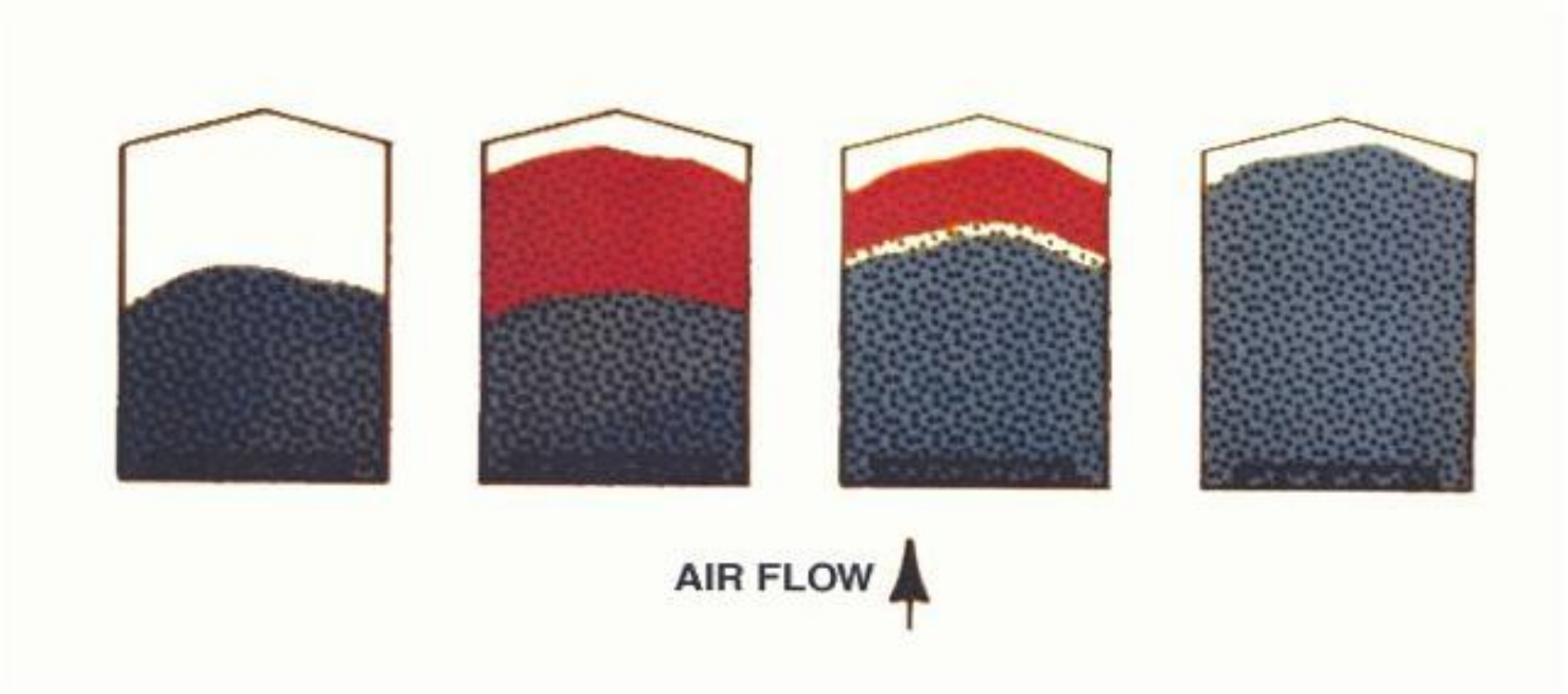
Aeration – Positive Pressure



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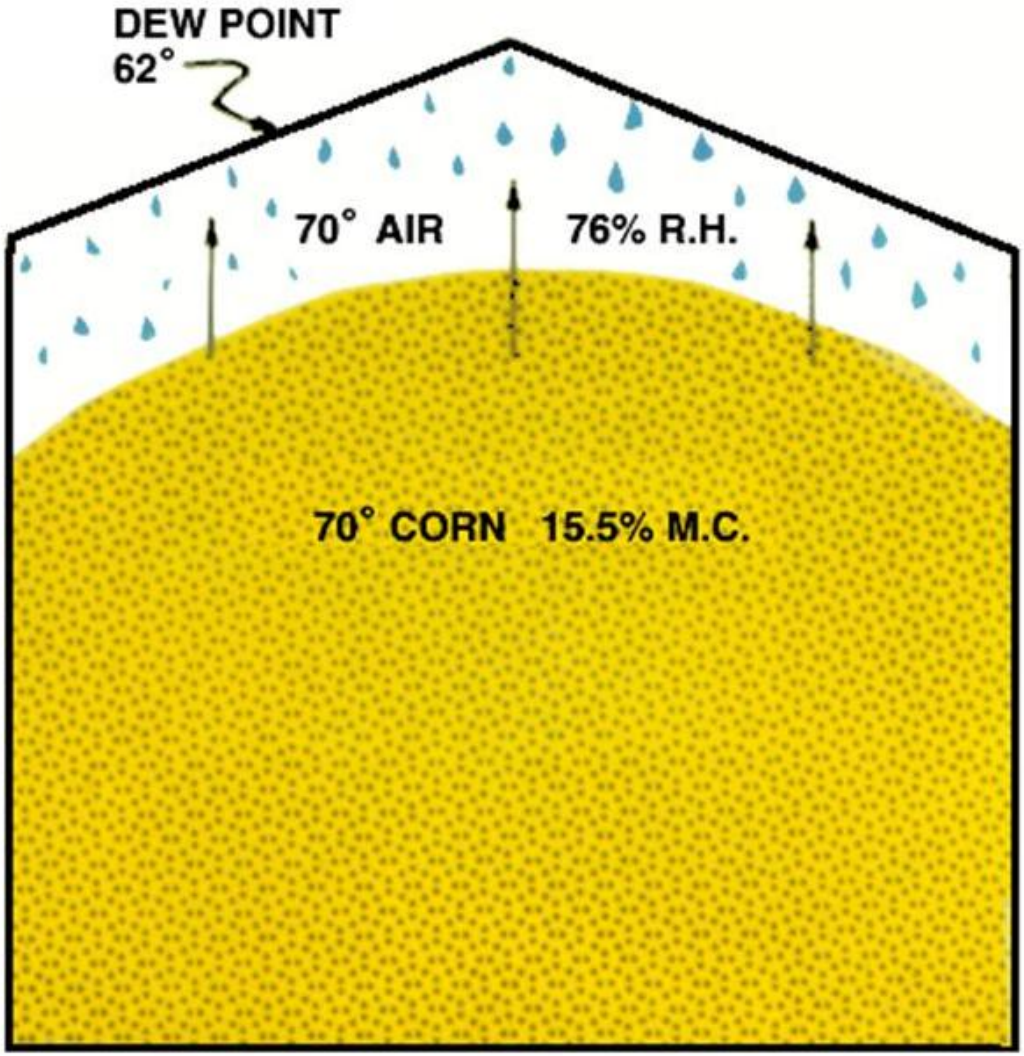
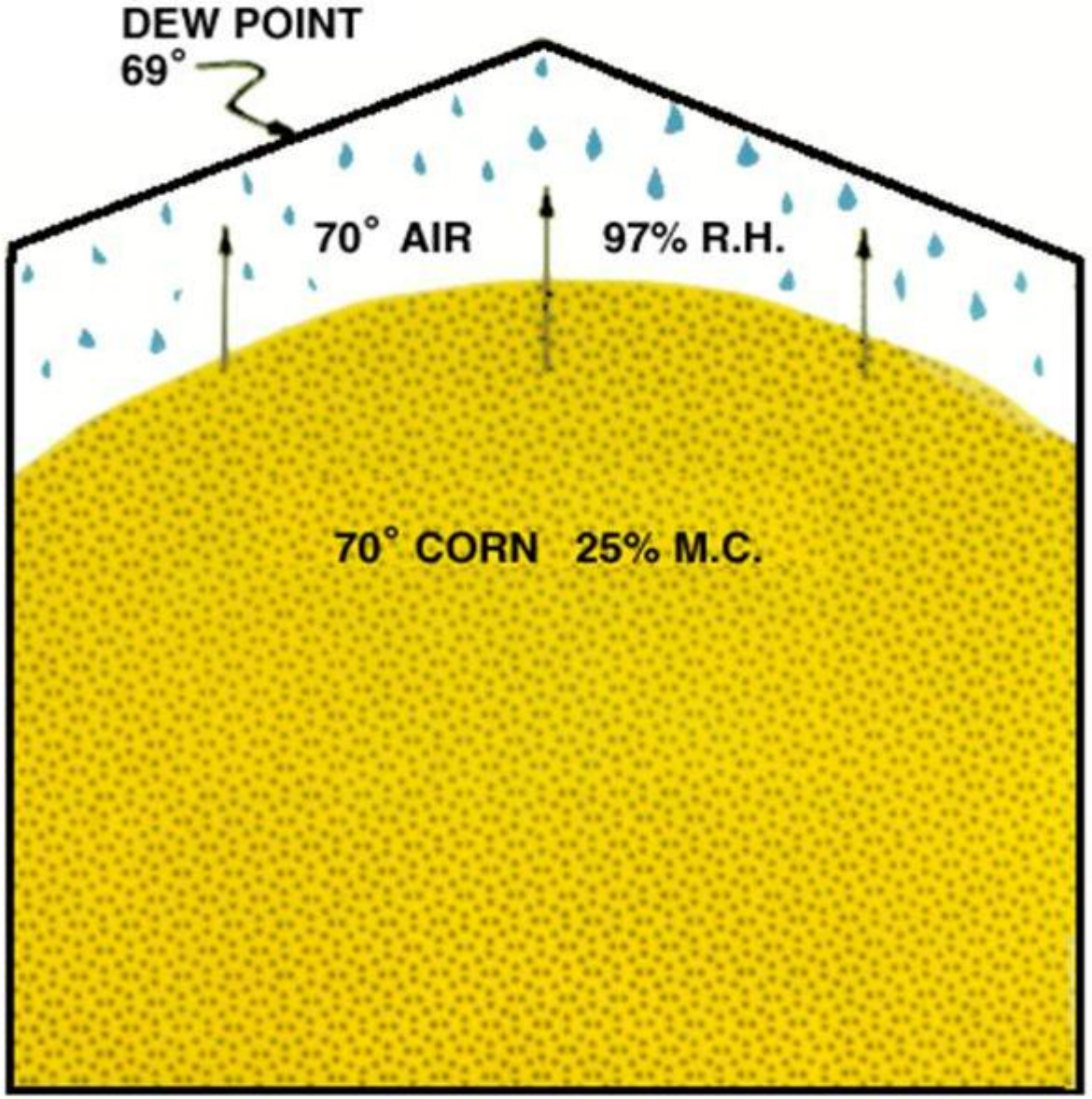
The dew point is the temperature at which the water vapor in air condenses into liquid water. At temperatures below the dew point, water will leave the air.

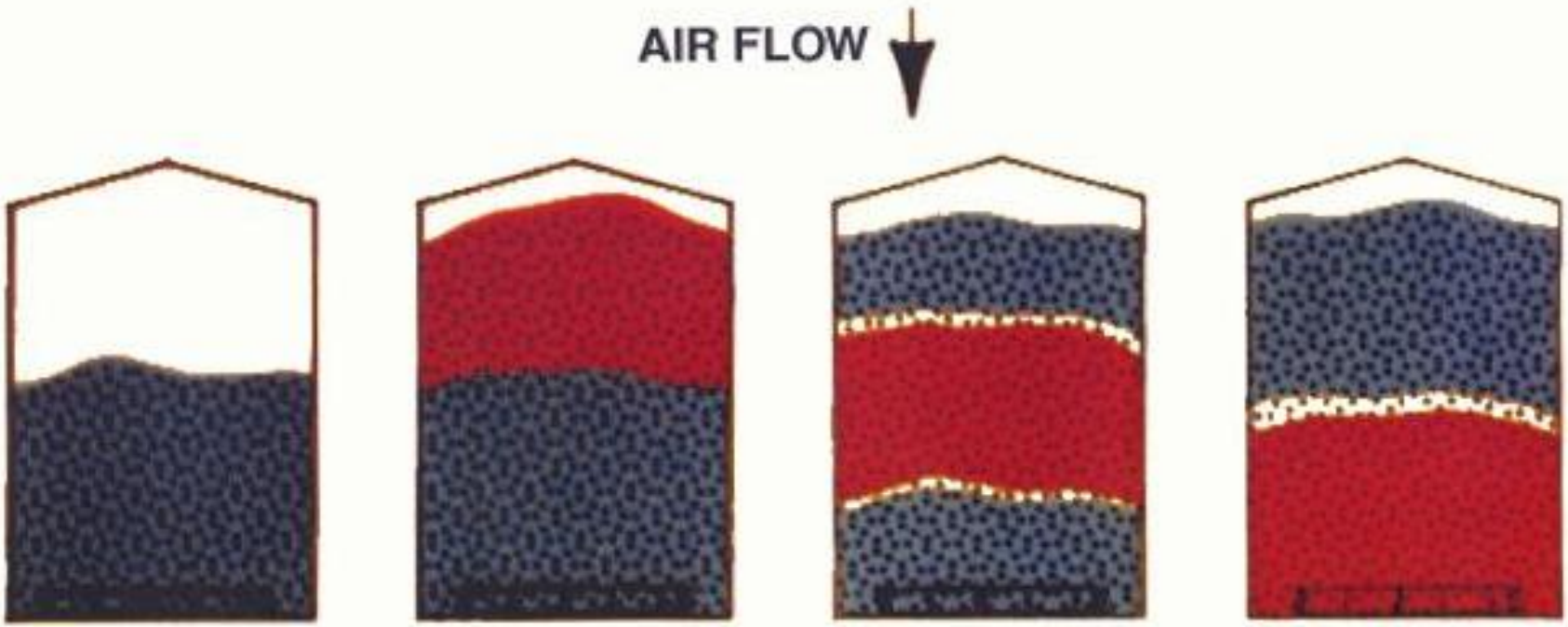
Dew drops are formed due to condensation of water vapors. Air contains water vapors which we call moisture or humidity. Hot air contains more moisture as compared to cold air. When the hot air comes into contact with some cold surface, water vapor present in it condenses on the cold surface in the form of droplets.



The higher moisture corn adds more moisture into the air. With more moisture in the air, a smaller drop in temperature is needed to release the moisture.



Aeration – Negative Pressure



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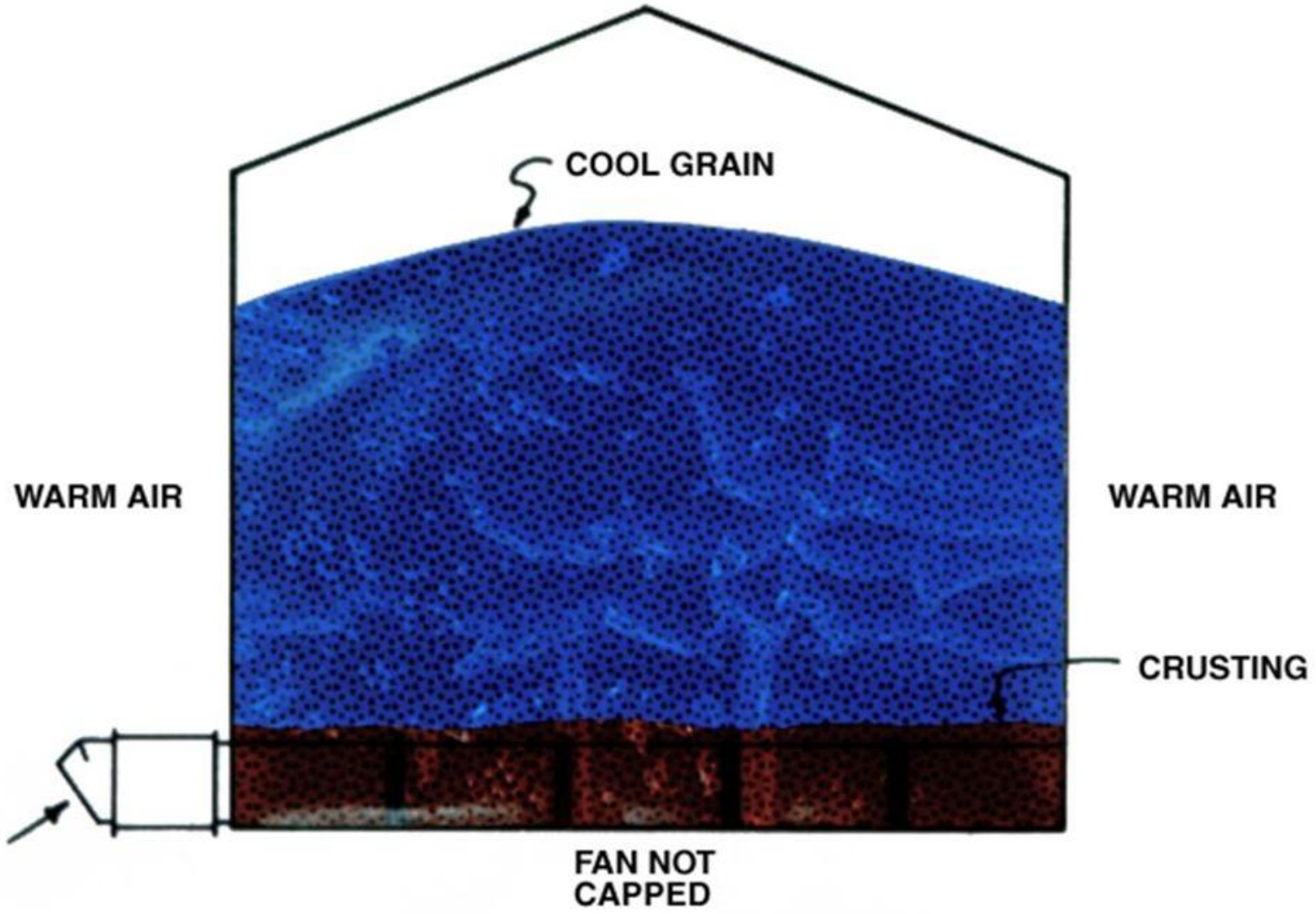
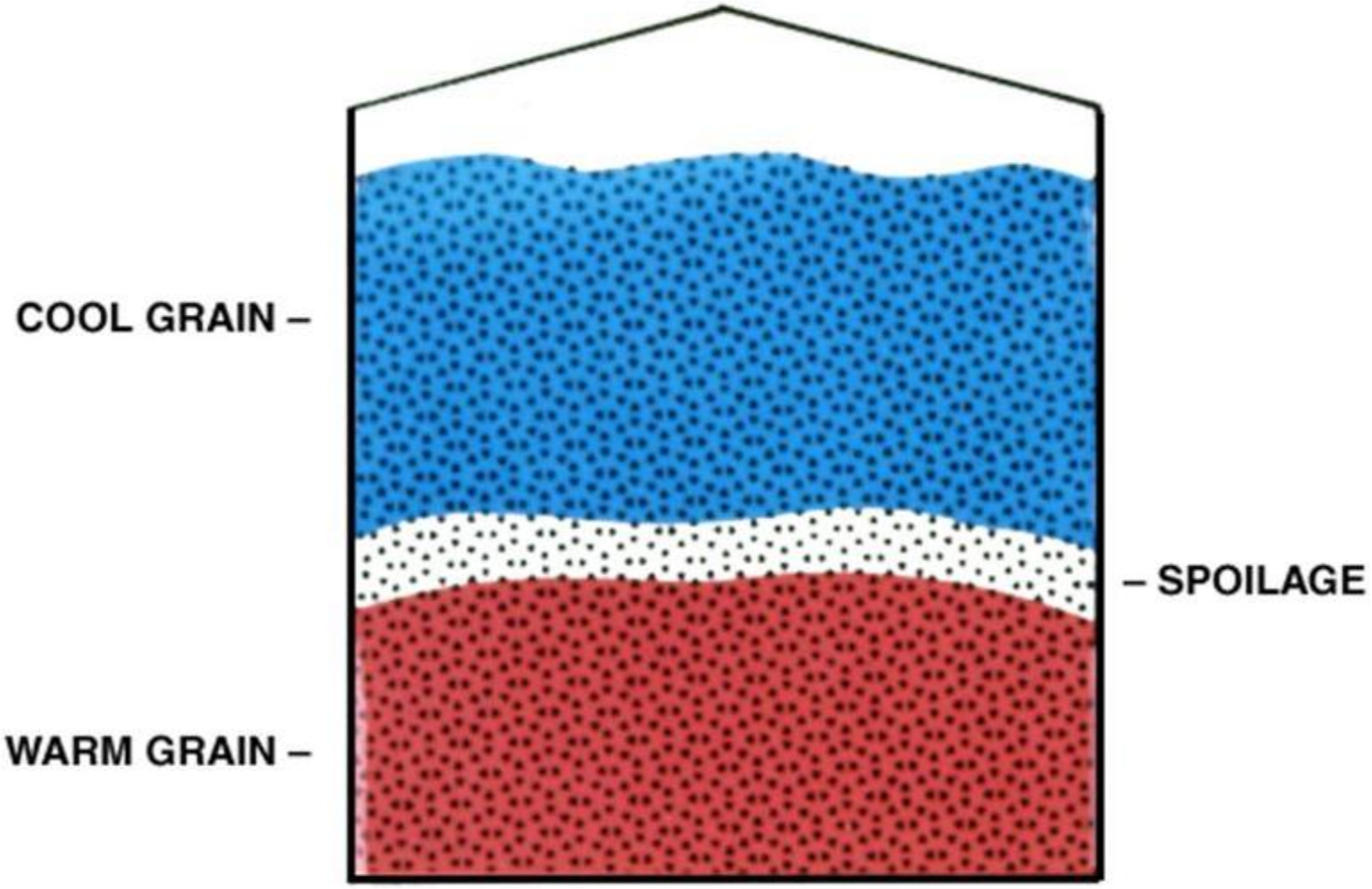
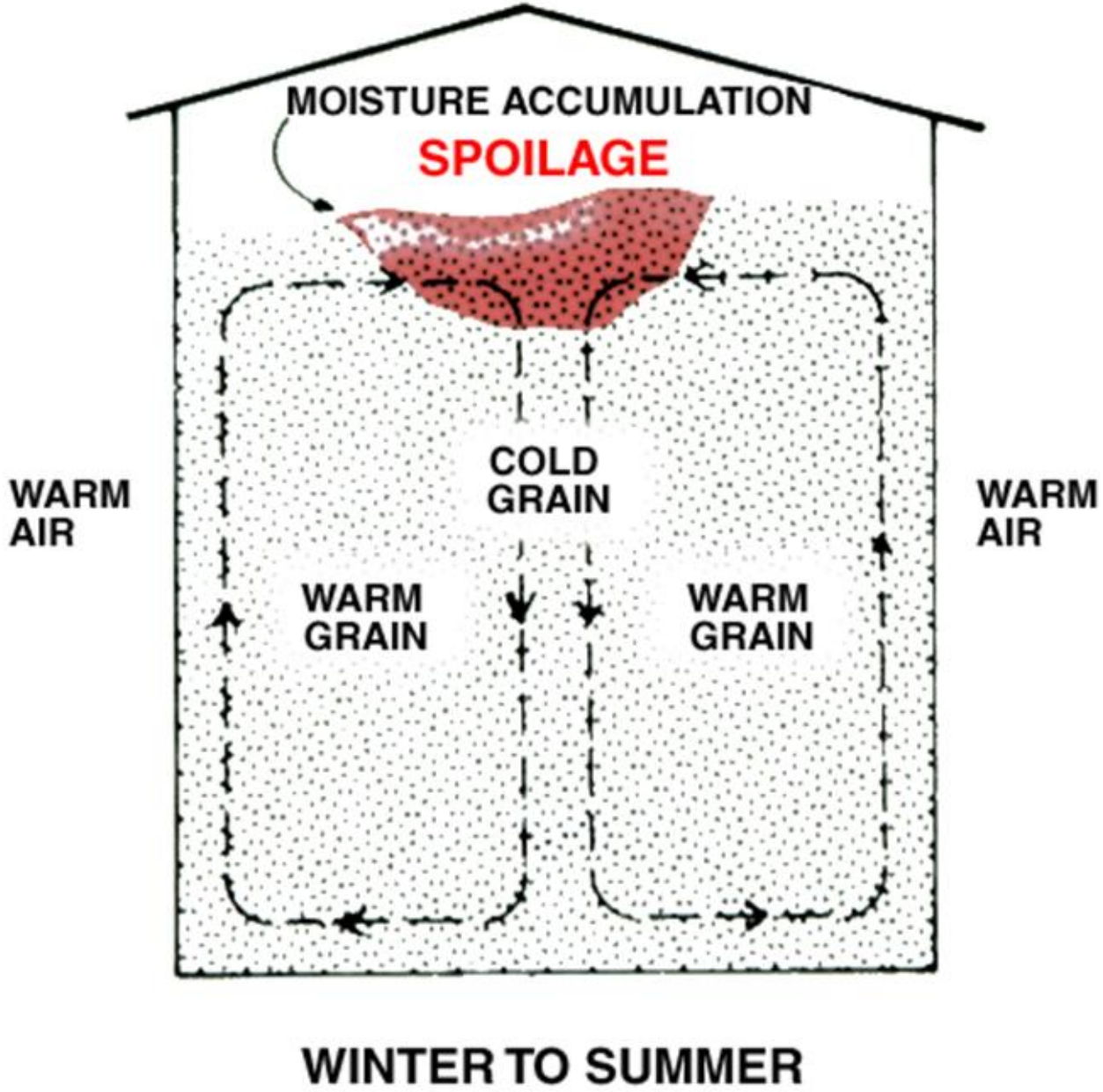
Should I cap aeration fans?

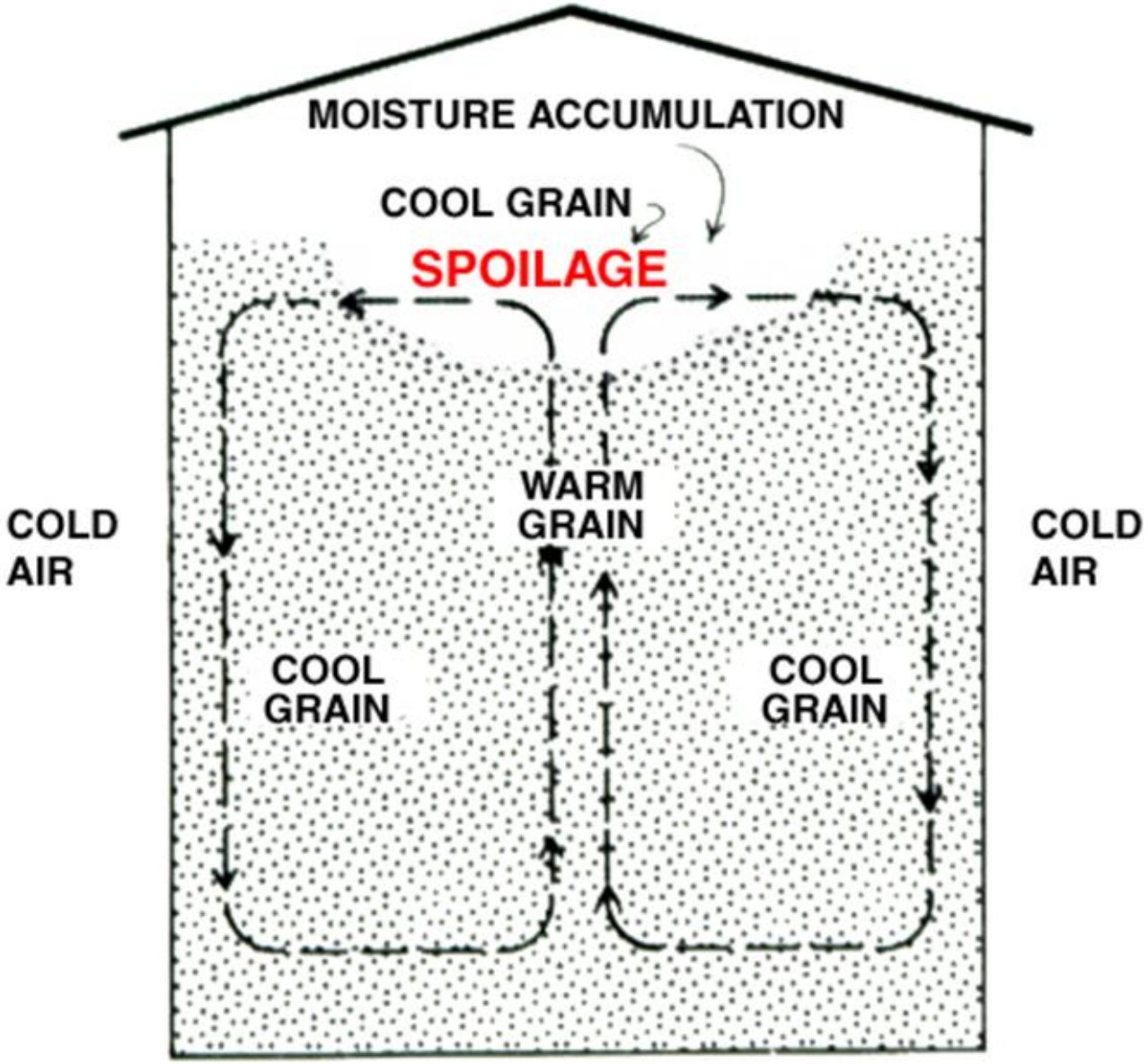




BINNING OF COOL GRAIN ON TOP OF WARM GRAIN



WINTER TO SUMMER



SUMMER TO WINTER

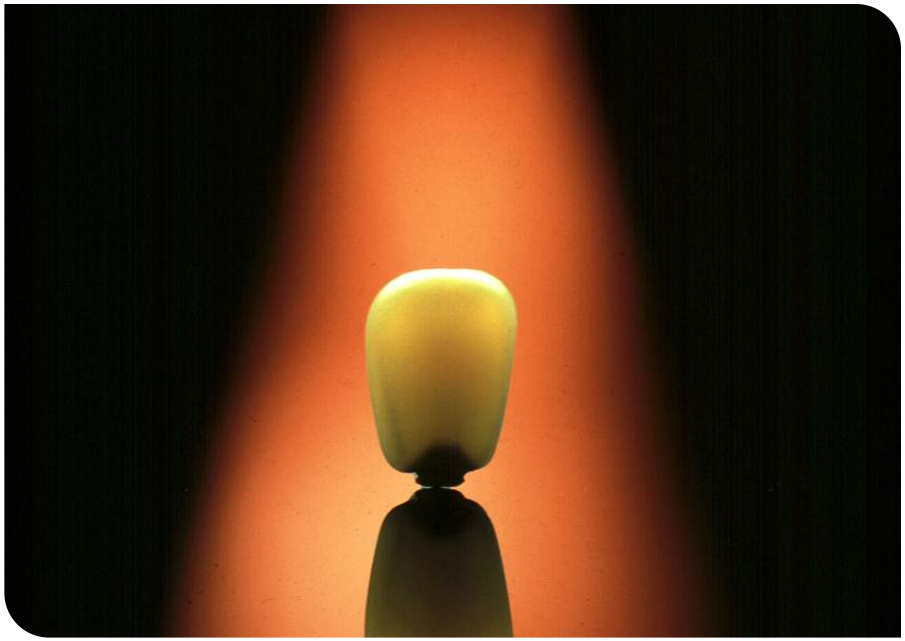
Allowable Storage Time for Corn (days)

Temp	Grain Moisture, %								
	15	16	18	20	22	24	26	28	30
35	----	670	265	112	74	49	37	30	25
45	650	385	150	64	42	28	21	17	14
55	360	215	86	36	24	16	12	10	8
60	270	165	65	28	18	12	9	7	6
65	200	125	49	21	14	9	7	5	4
70	152	93	37	16	10	7	5	4	3
80	84	53	17	9	5	4	3	2	2

Allowable Storage Time for Soybean (days)

Temp	14	16	18	20	22
40	230	140	75	40	12
45	175	95	40	19	9
50	134	65	23	12	7
55	100	40	15	9	4
60	76	27	11	7	3
70	41	14	6	3	2
80	25	8	2	1	0

Thank you!!!



Questions??

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