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Wide Swath Haylage to Save Time & Nutrients

Tom Kilcer

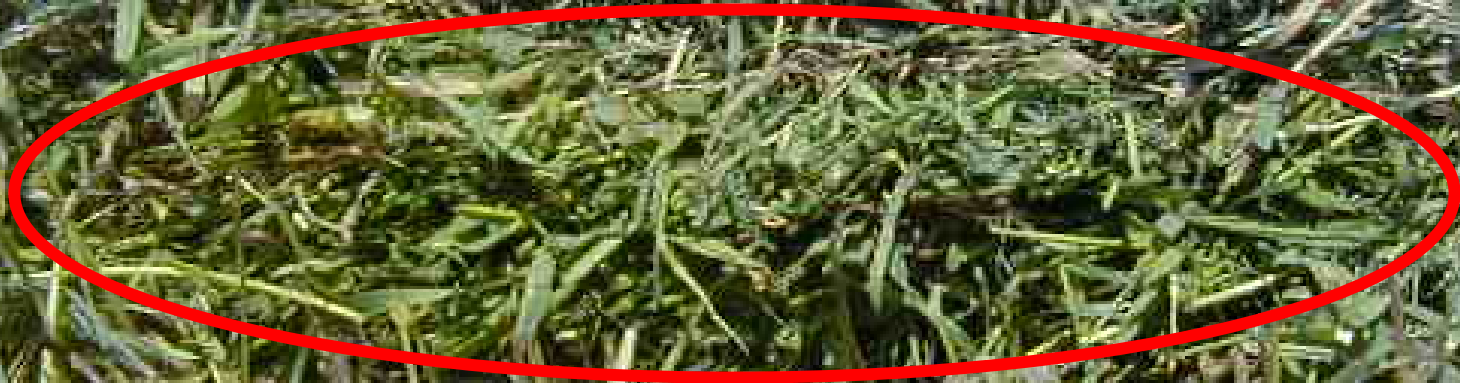
Cornell Cooperative Extension in
Rensselaer County, New York



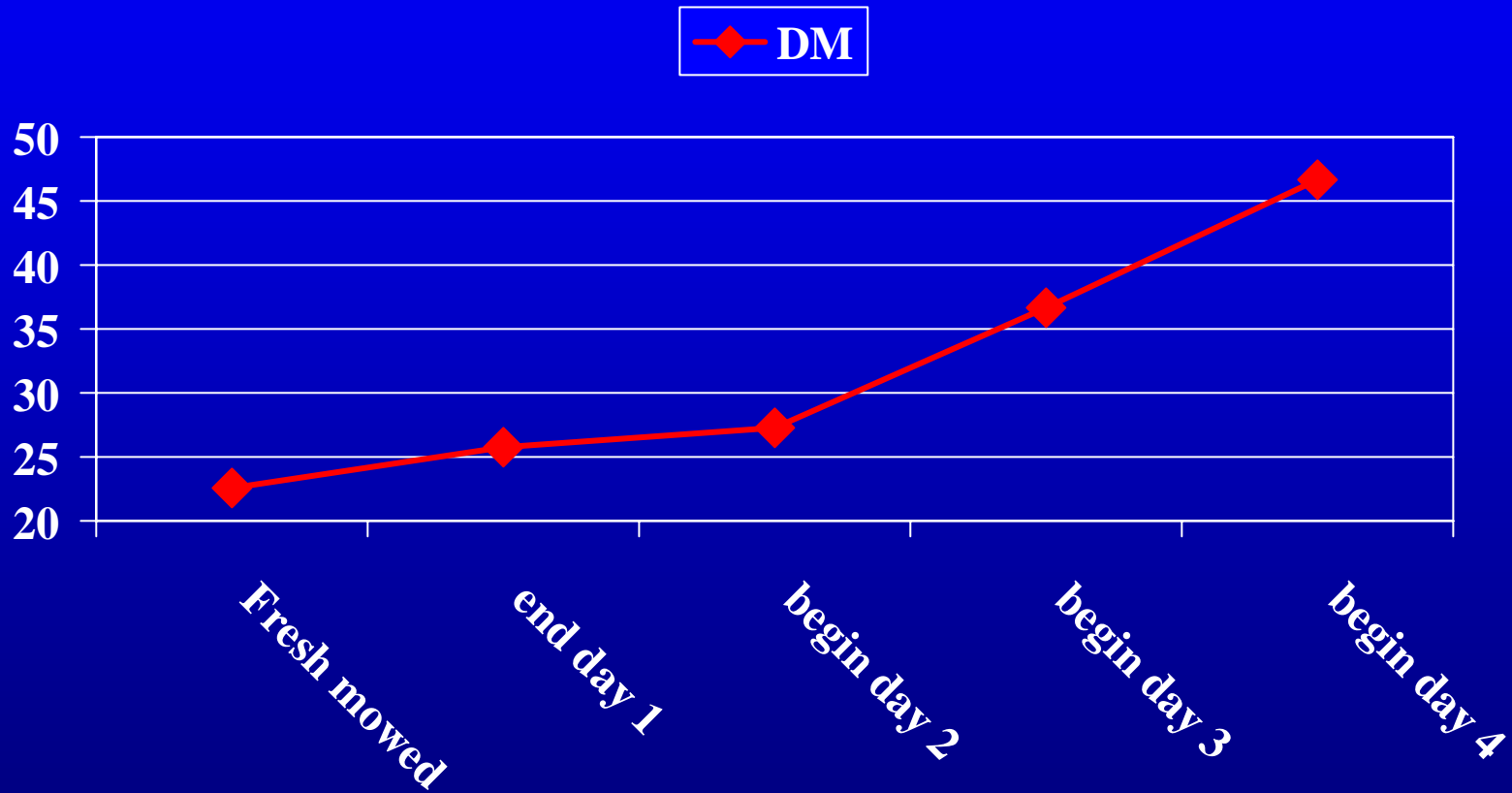
24 – 48 Hours

3/4 inch

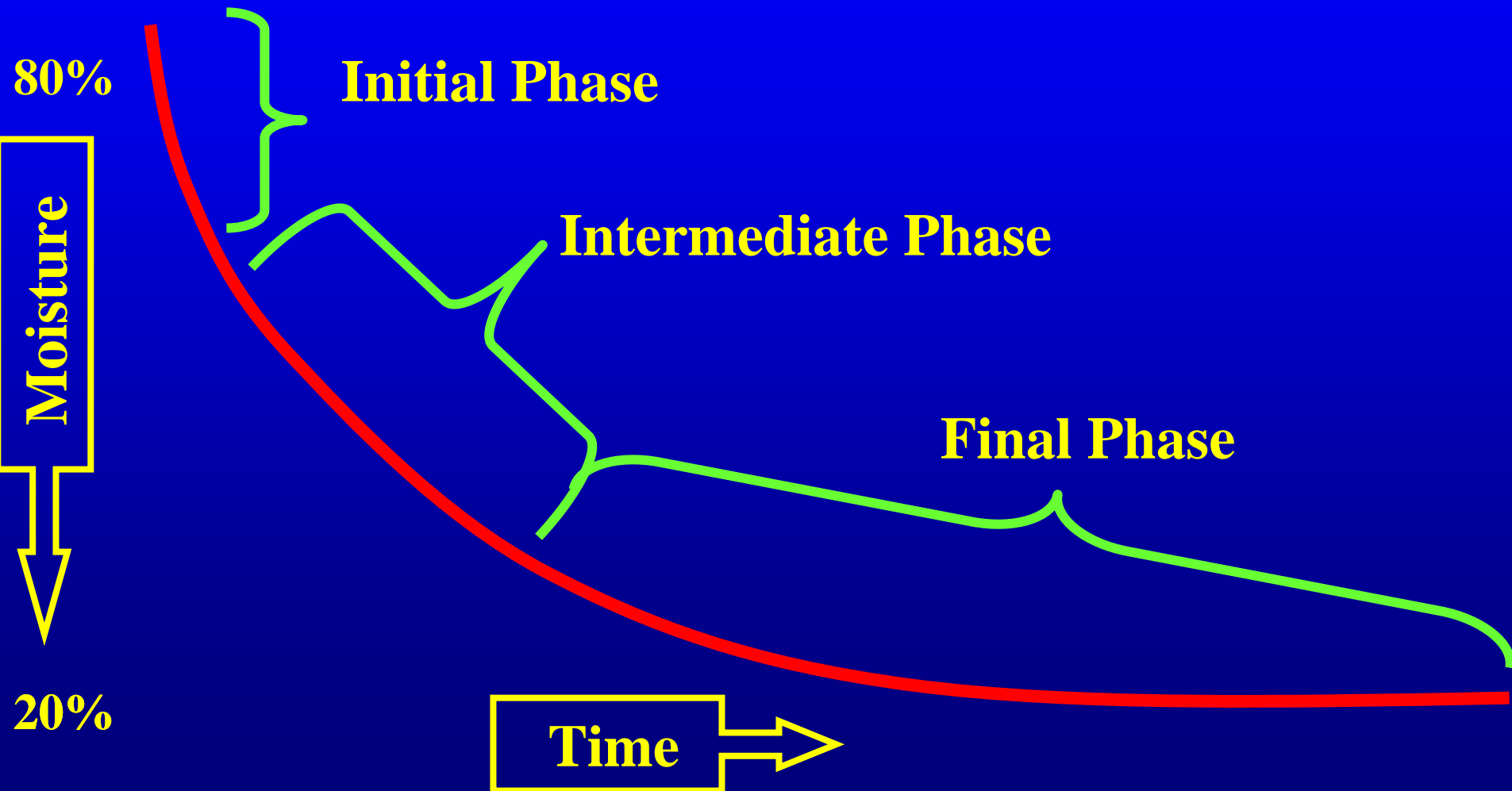
Jones and Harris 1980

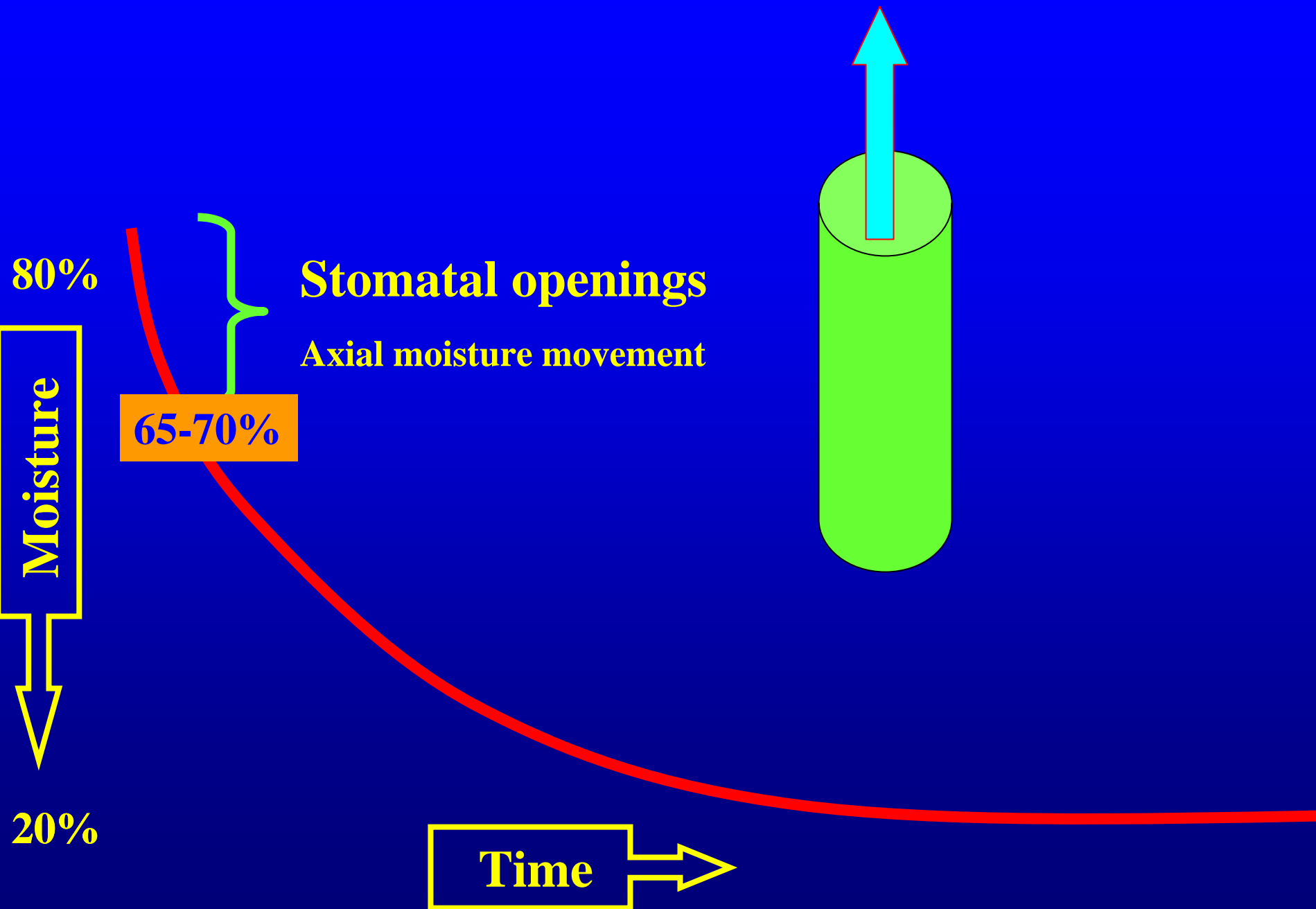


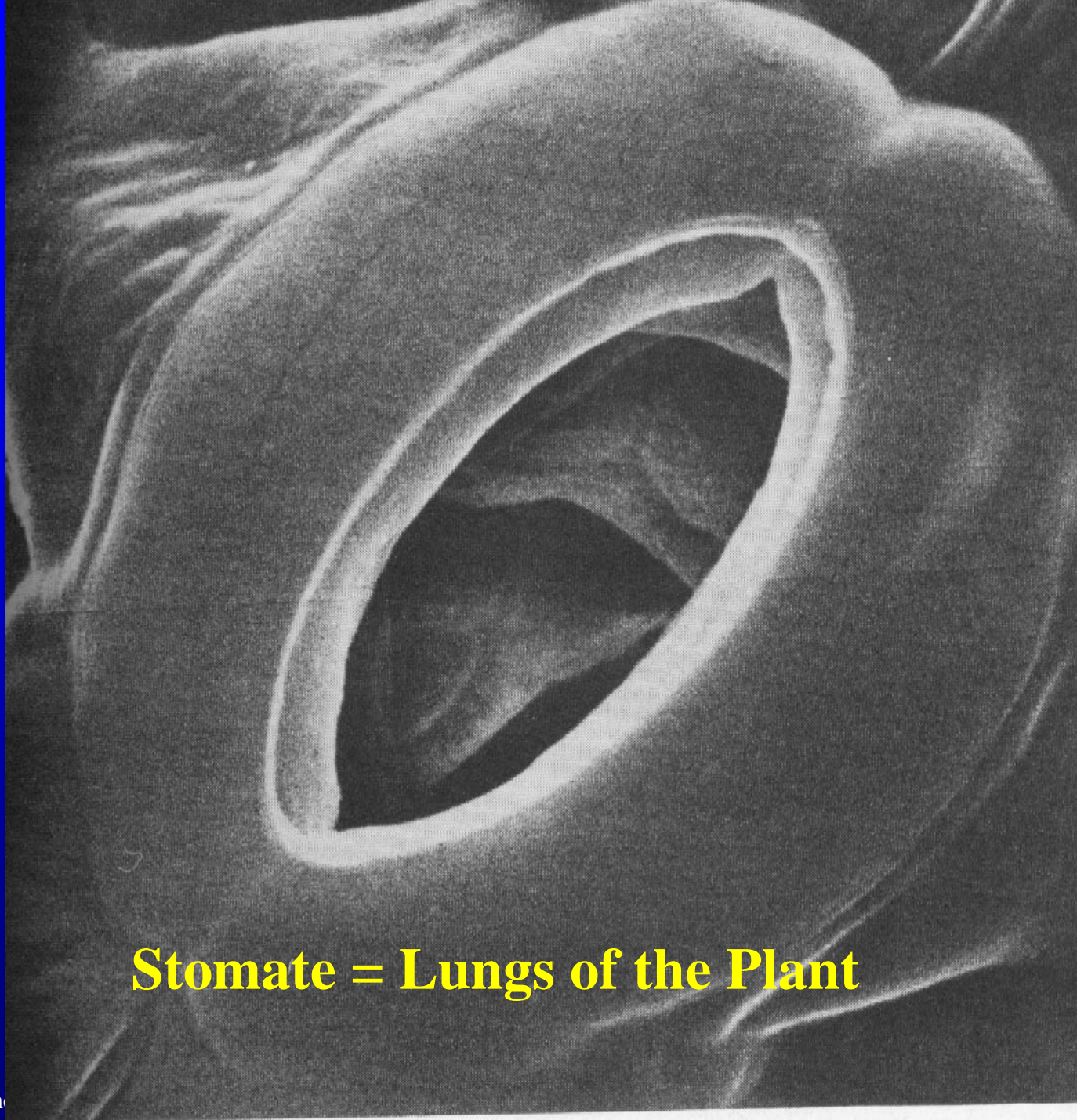
Traditional Drying - Narrow Swath



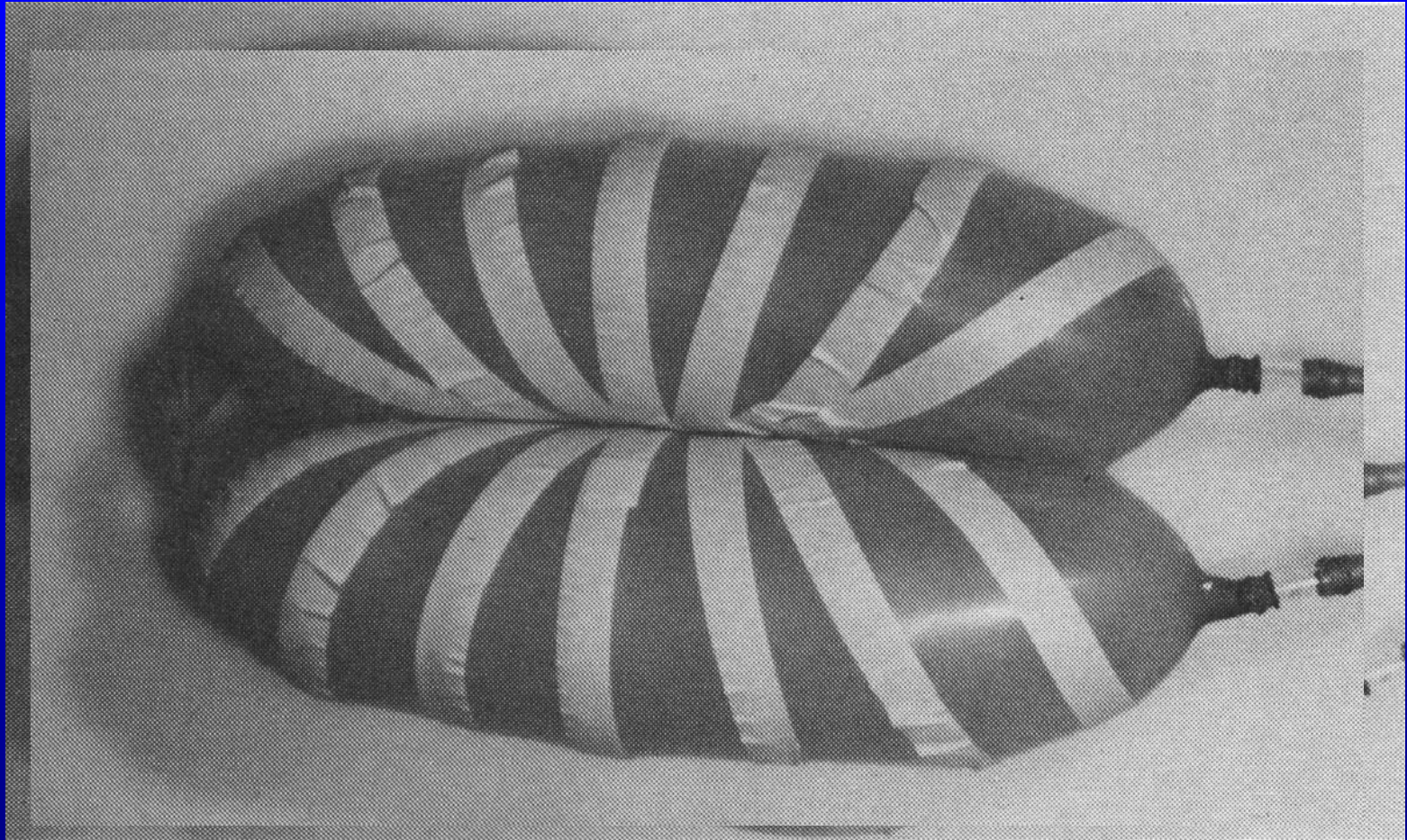
Biology of Drying Forages



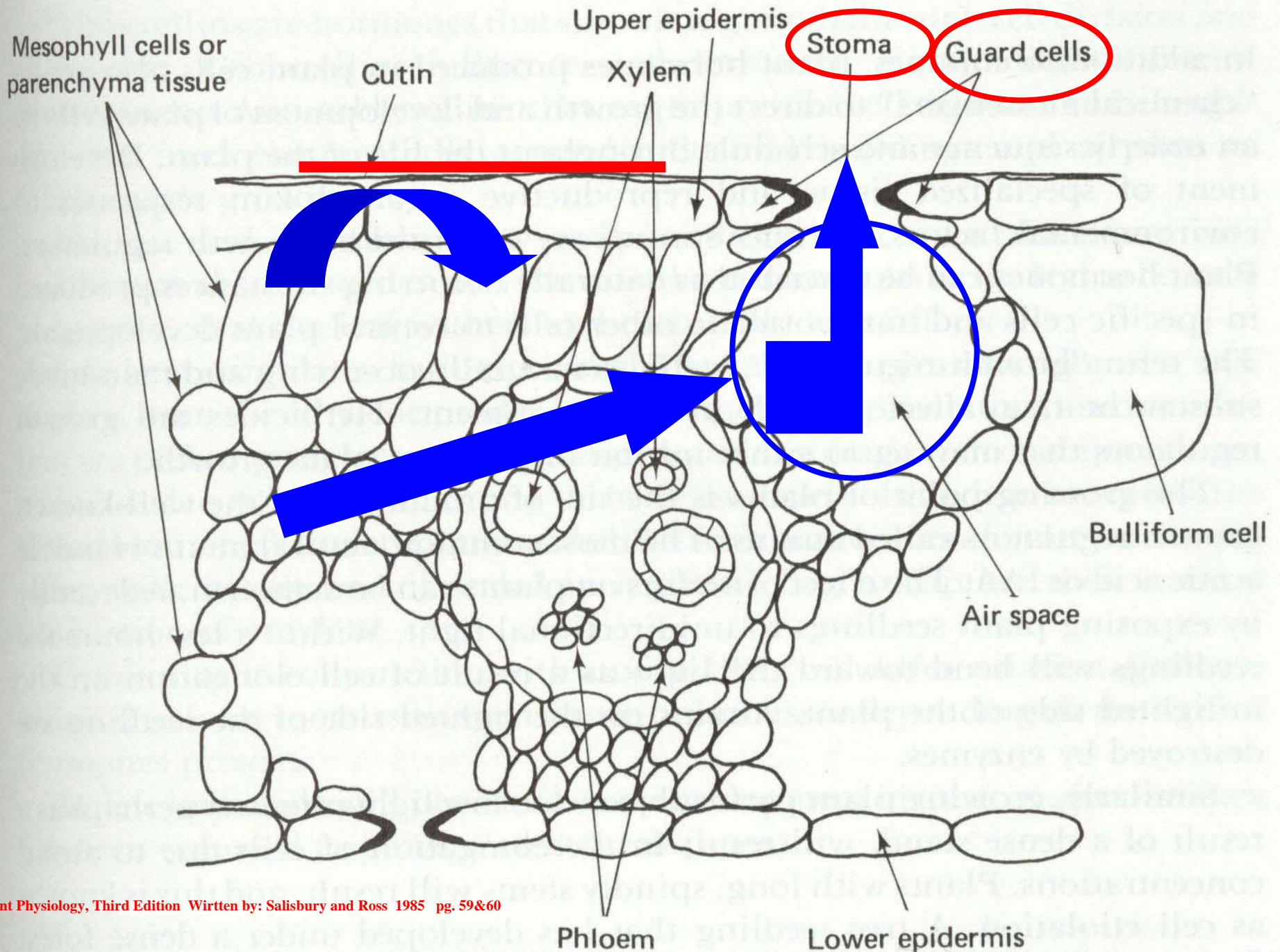




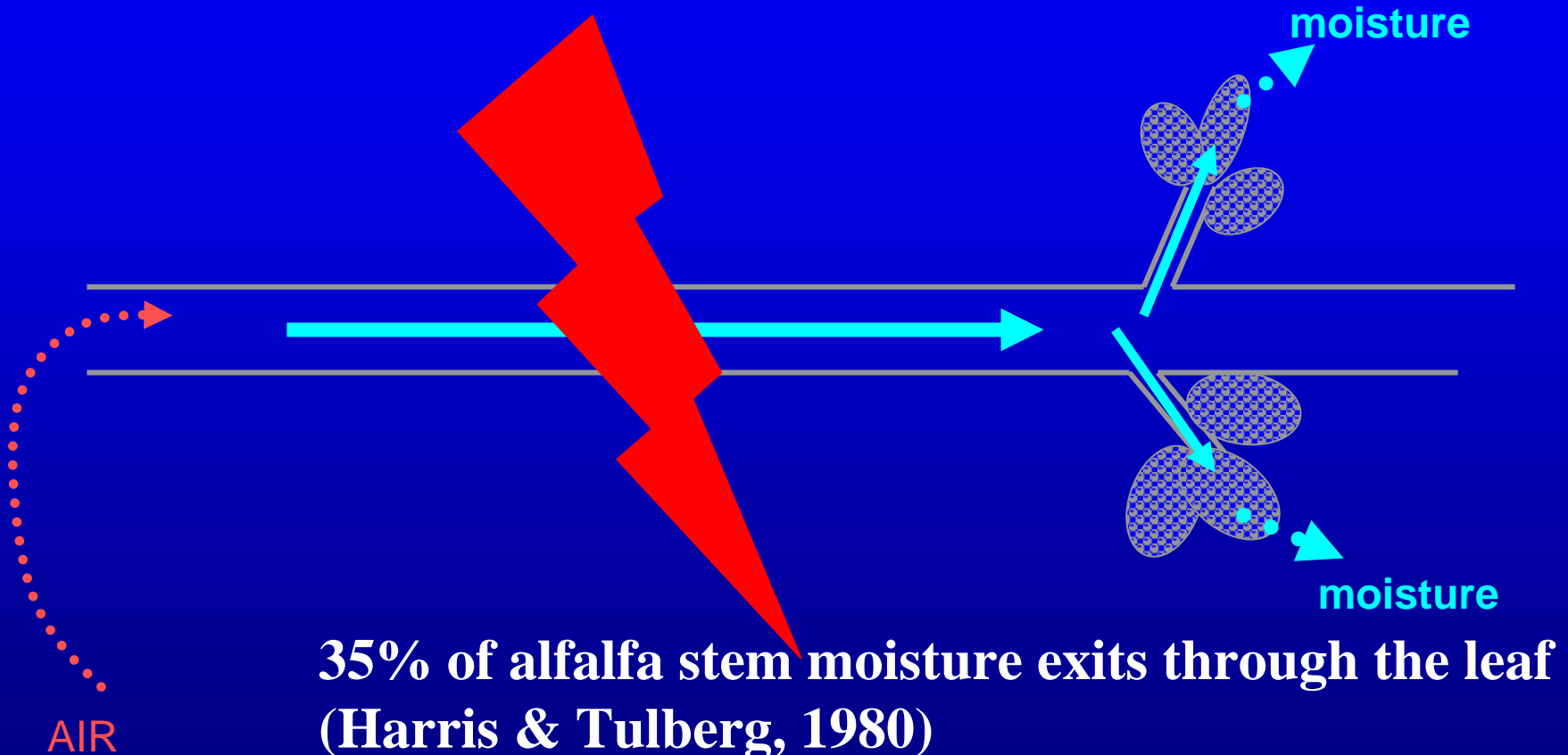
Stomate = Lungs of the Plant



Plant Physiology, Salisbury and Ross, 1985 p60.



Conditioning Breaks Capillary Flow



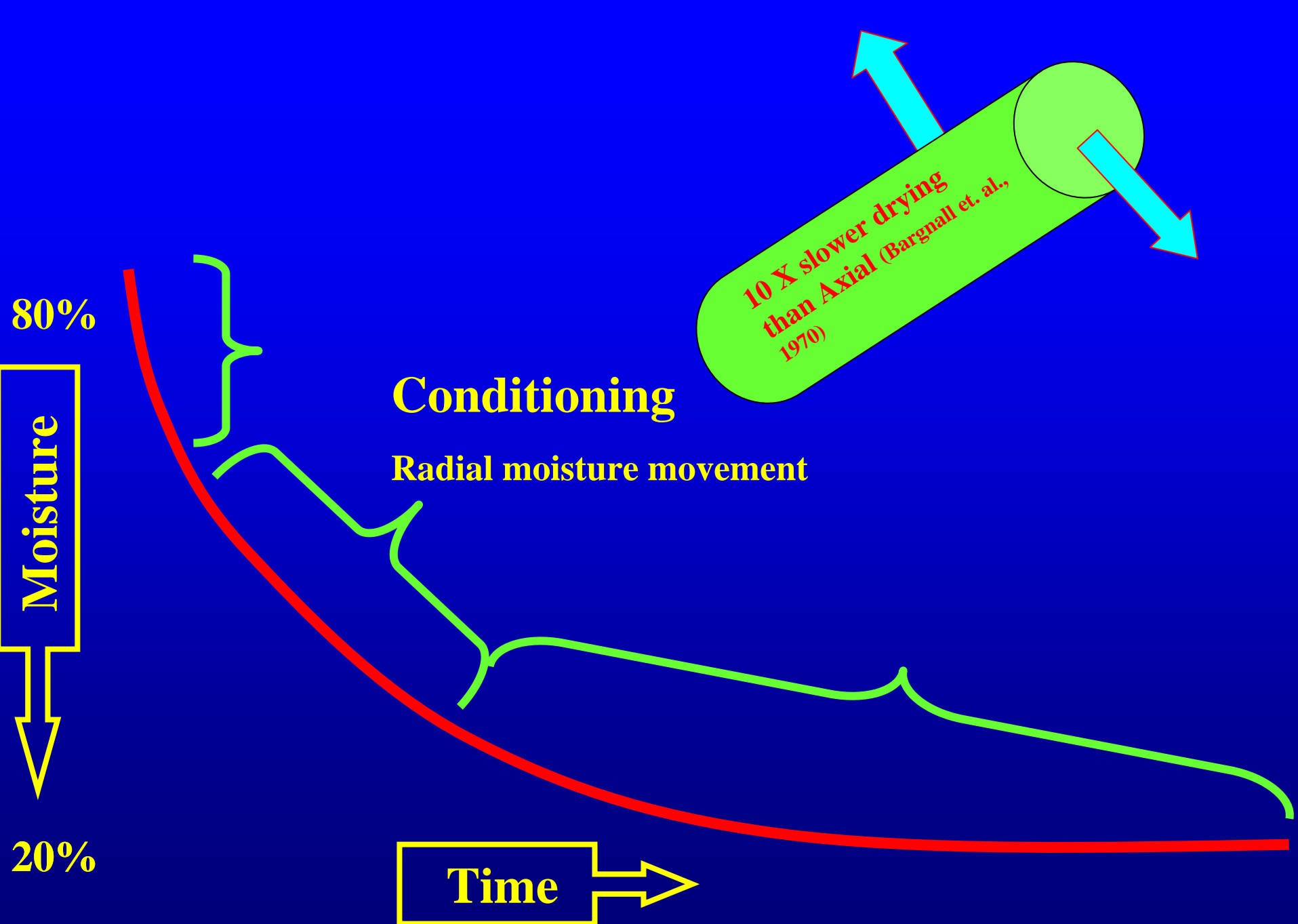
**35% of alfalfa stem moisture exits through the leaf
(Harris & Tulberg, 1980)**

Legumes 10X more stomata than Grass

Stomata

Sunlight - open

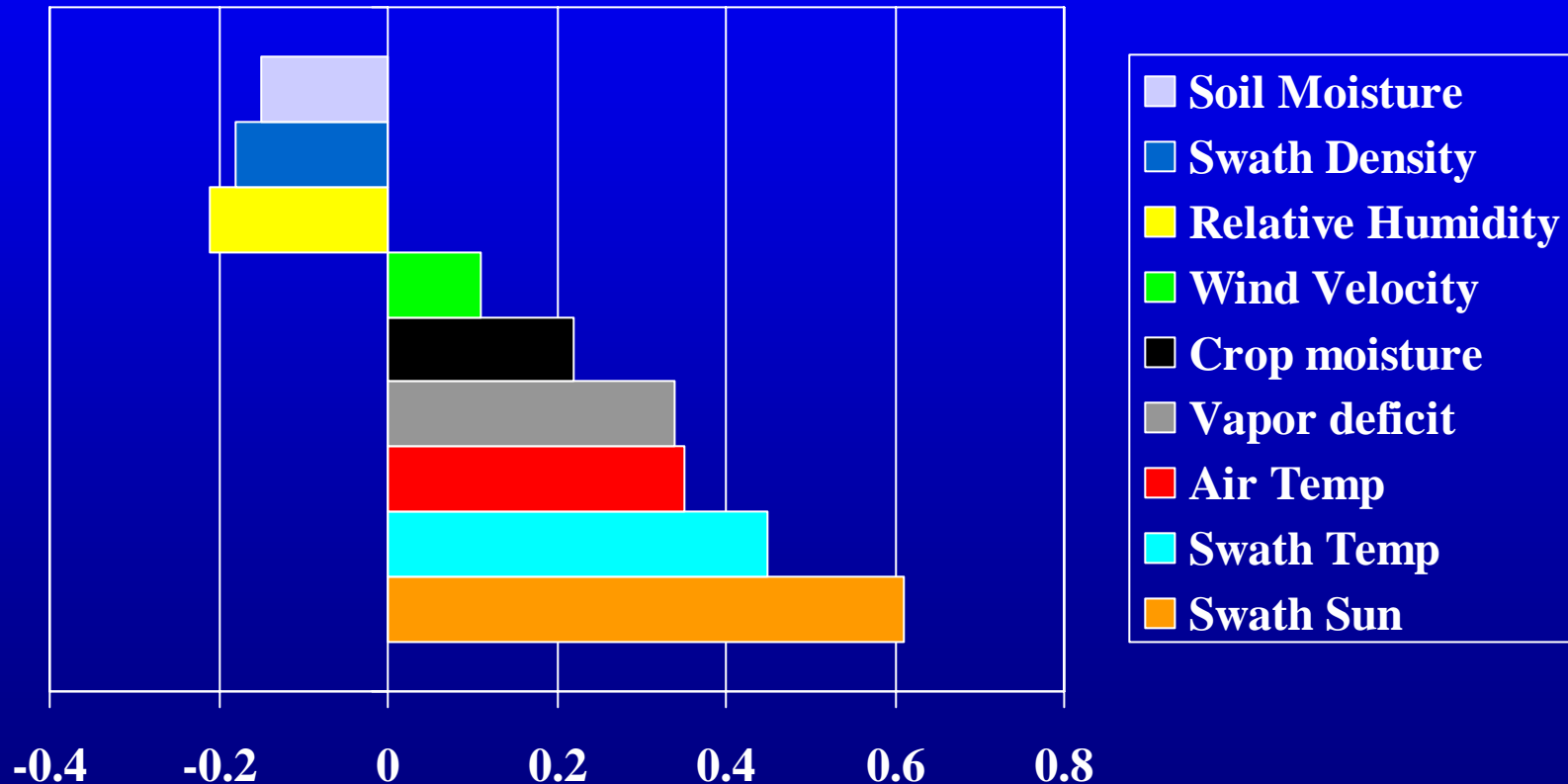
Shade - closed



Physics of Moisture Loss

or

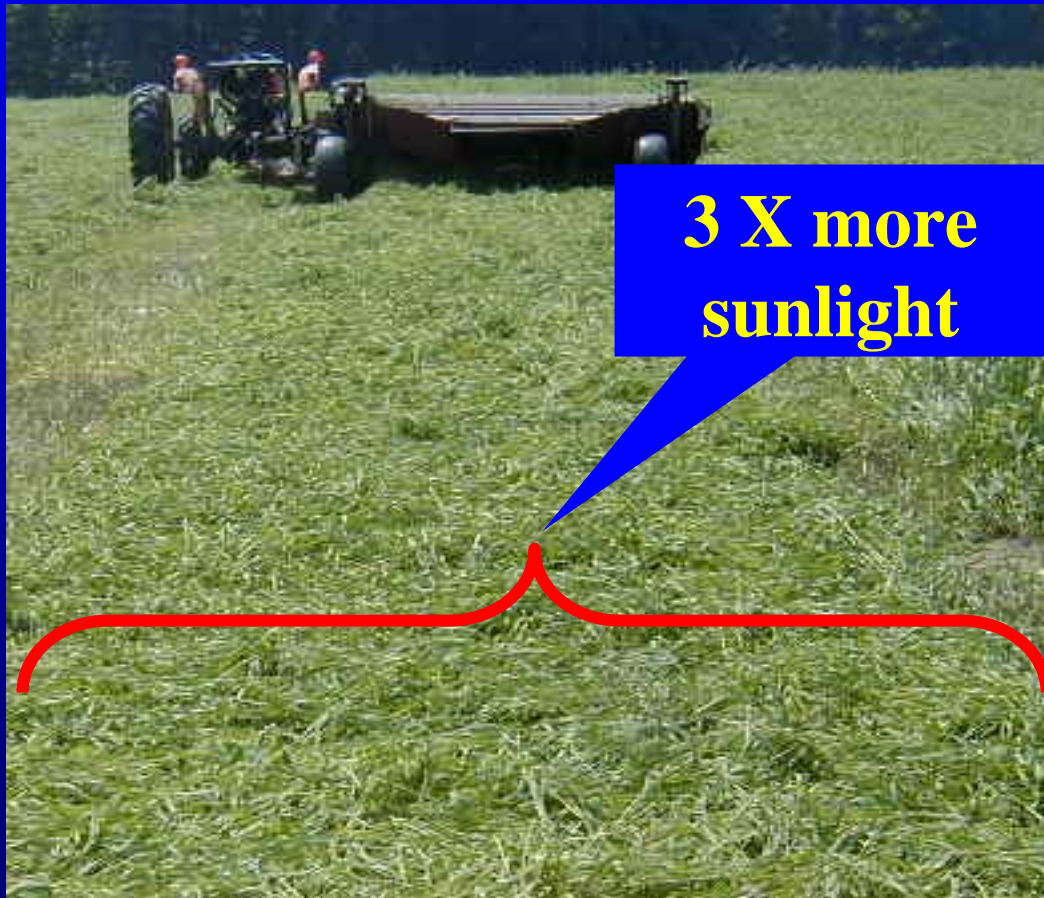
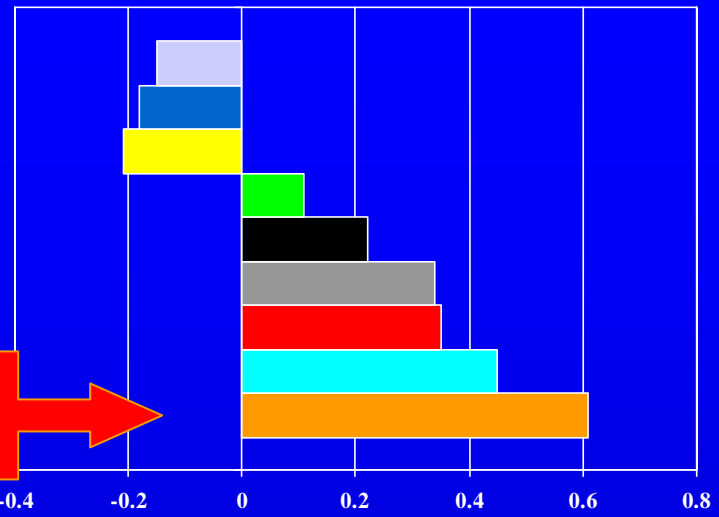
What Helps or Hurts Drying



Rotz et.al 1987



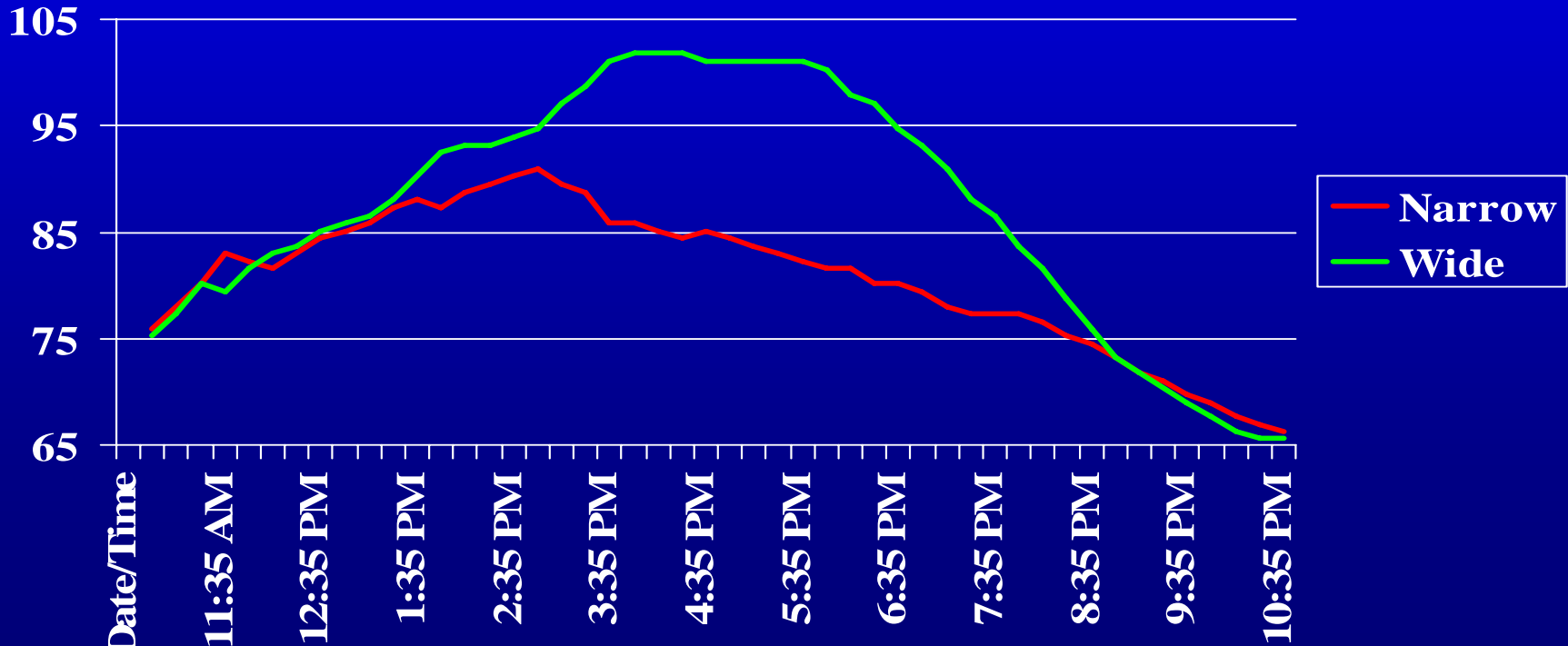
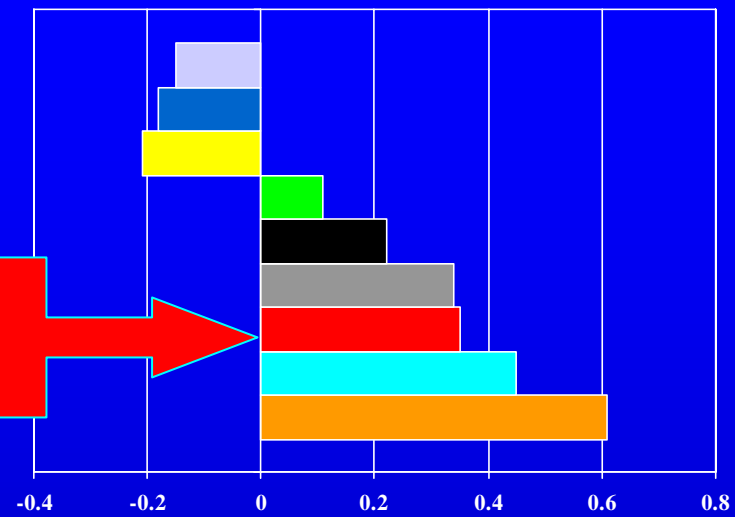
**Swath
Sunlight**

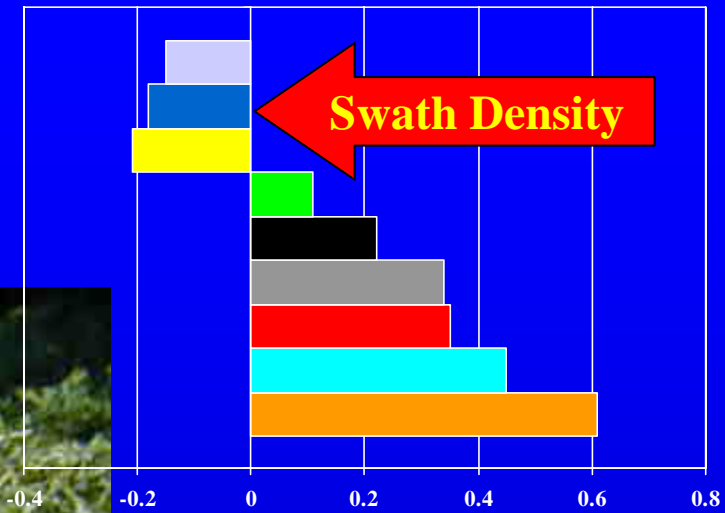


**3 X more
sunlight**

2nd Cut Grass Swath Core Temp

Swath Air &
Swath Temp





**Density had
greater impact on
drying than
Conditioning,
Mixing or
Turning Swath**

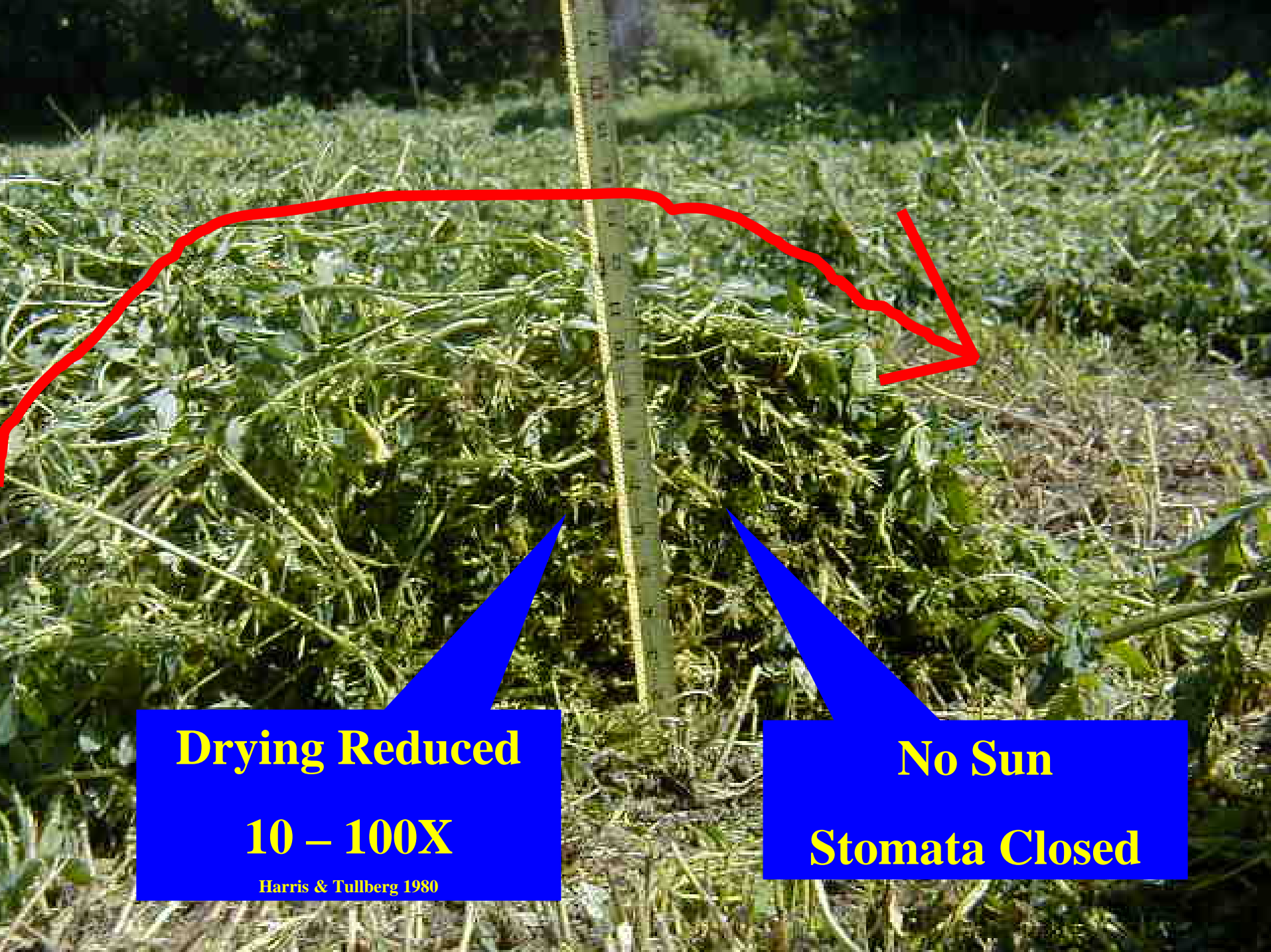
Wright et al. 1997

Swath density decreases moisture removal



5.5X More Dense

Wright, et al 1997 Grass and Forage Sci. 52:86-98



Drying Reduced

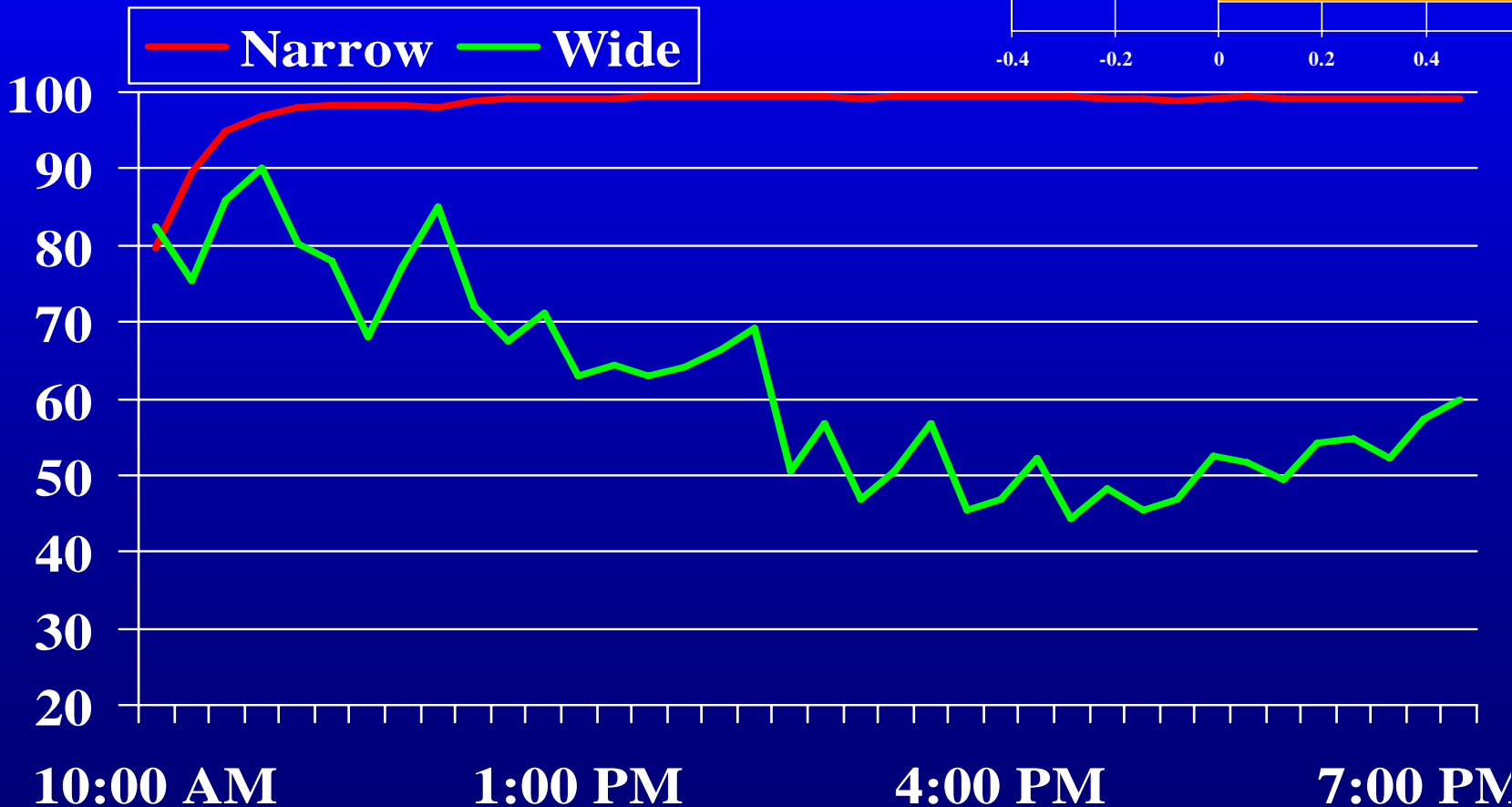
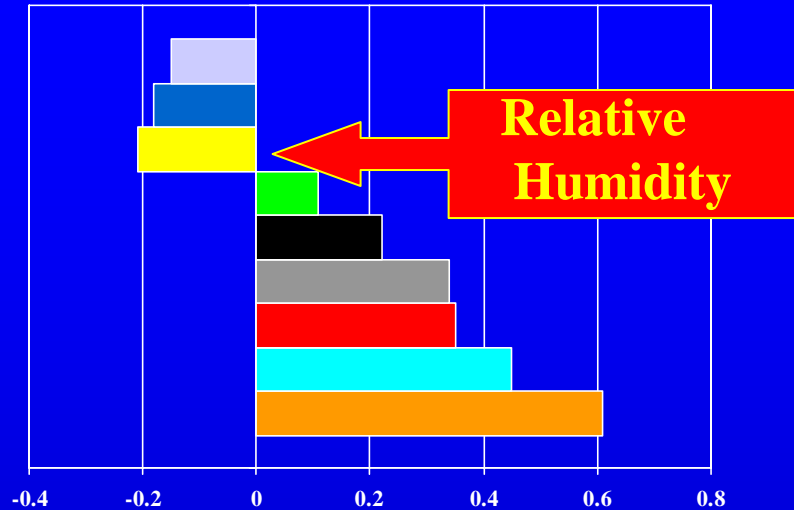
10 – 100X

Harris & Tullberg 1980

No Sun

Stomata Closed

Swath Core Relative Humidity



Wide swath

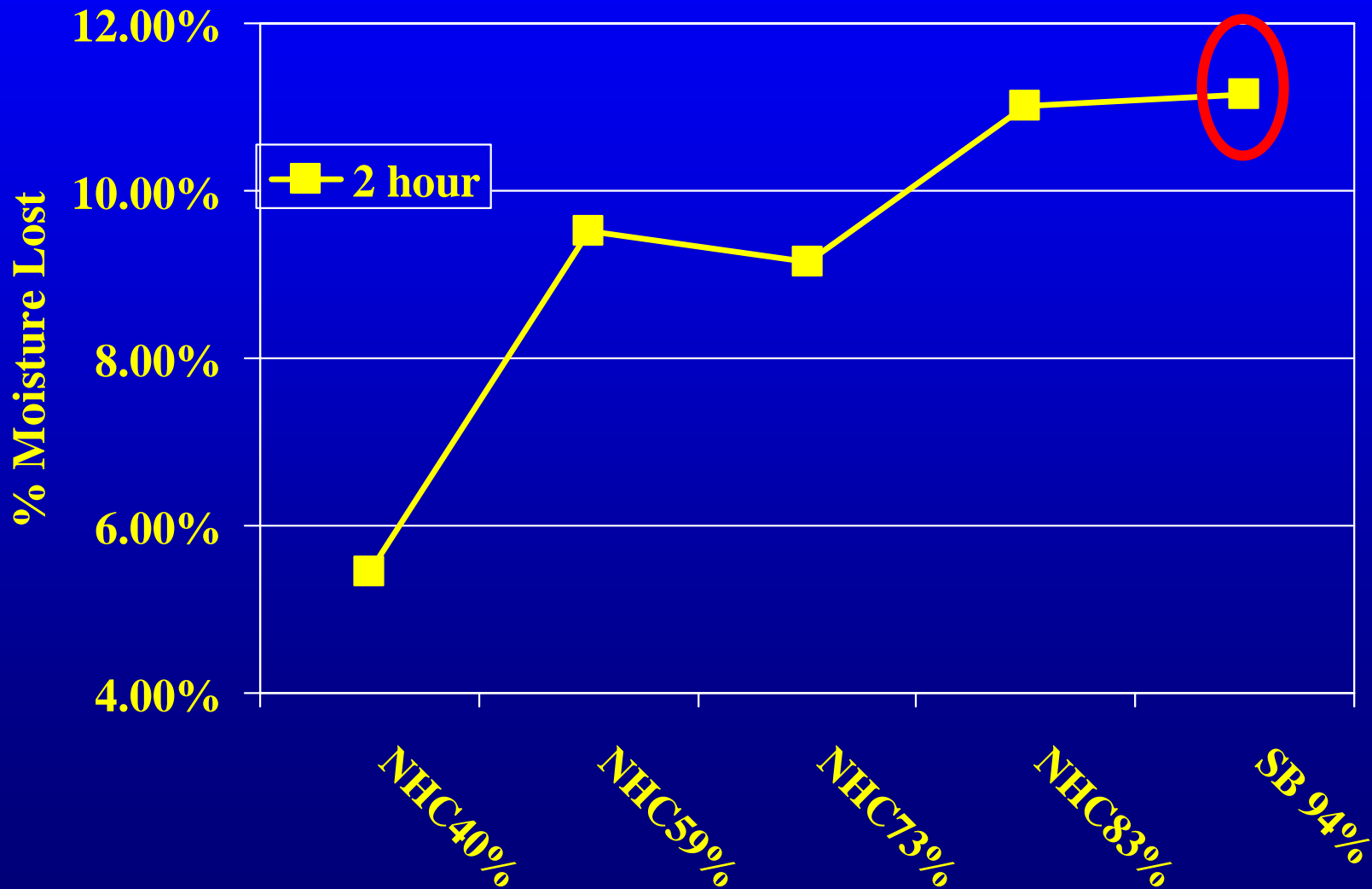


Field Results?

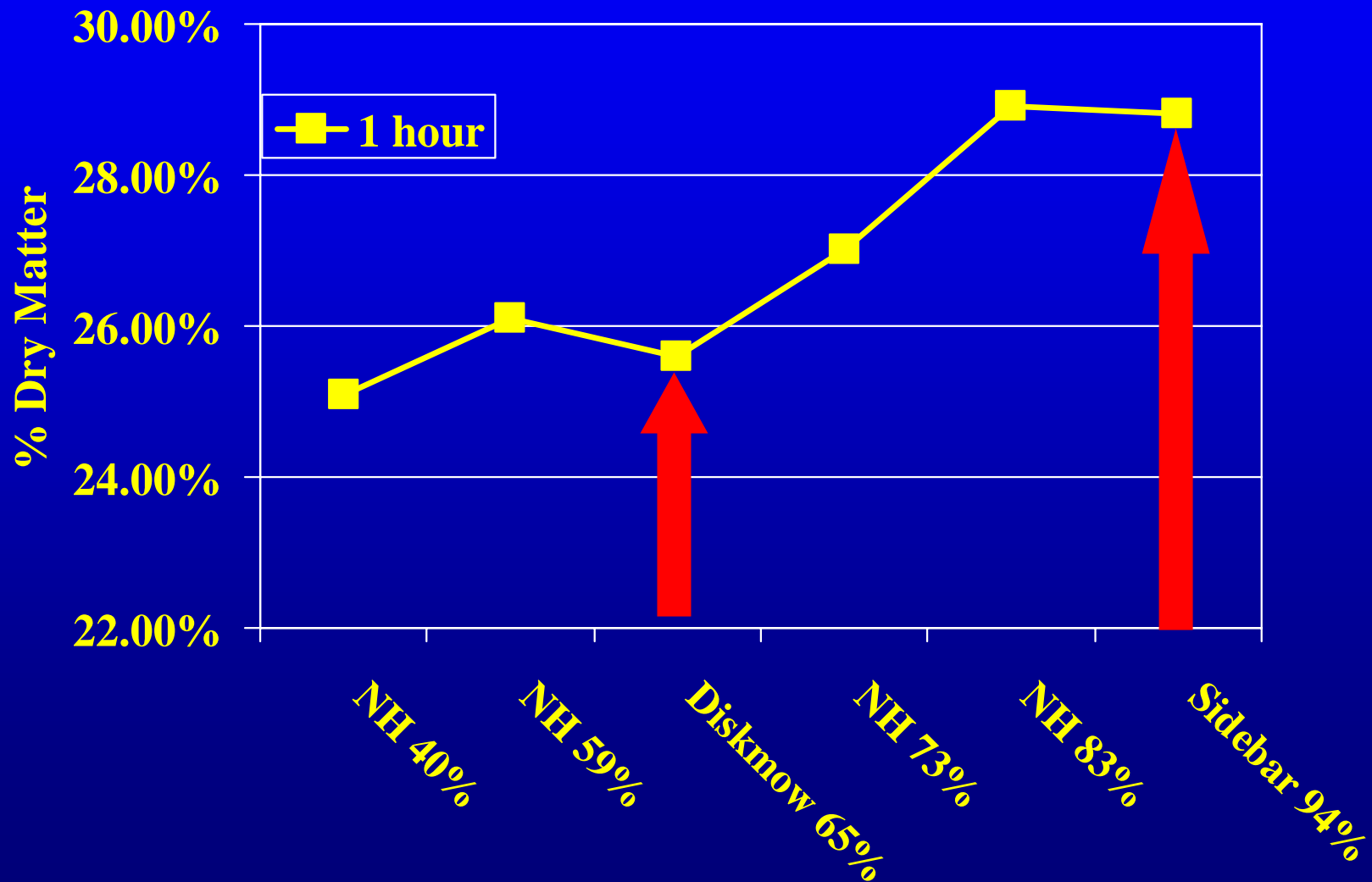
12 ft mower opened to wide swath = 8 ft.
66% of cutterbar width



Width Matters More Than Conditioning – Alfalfa- Swath Not Moved

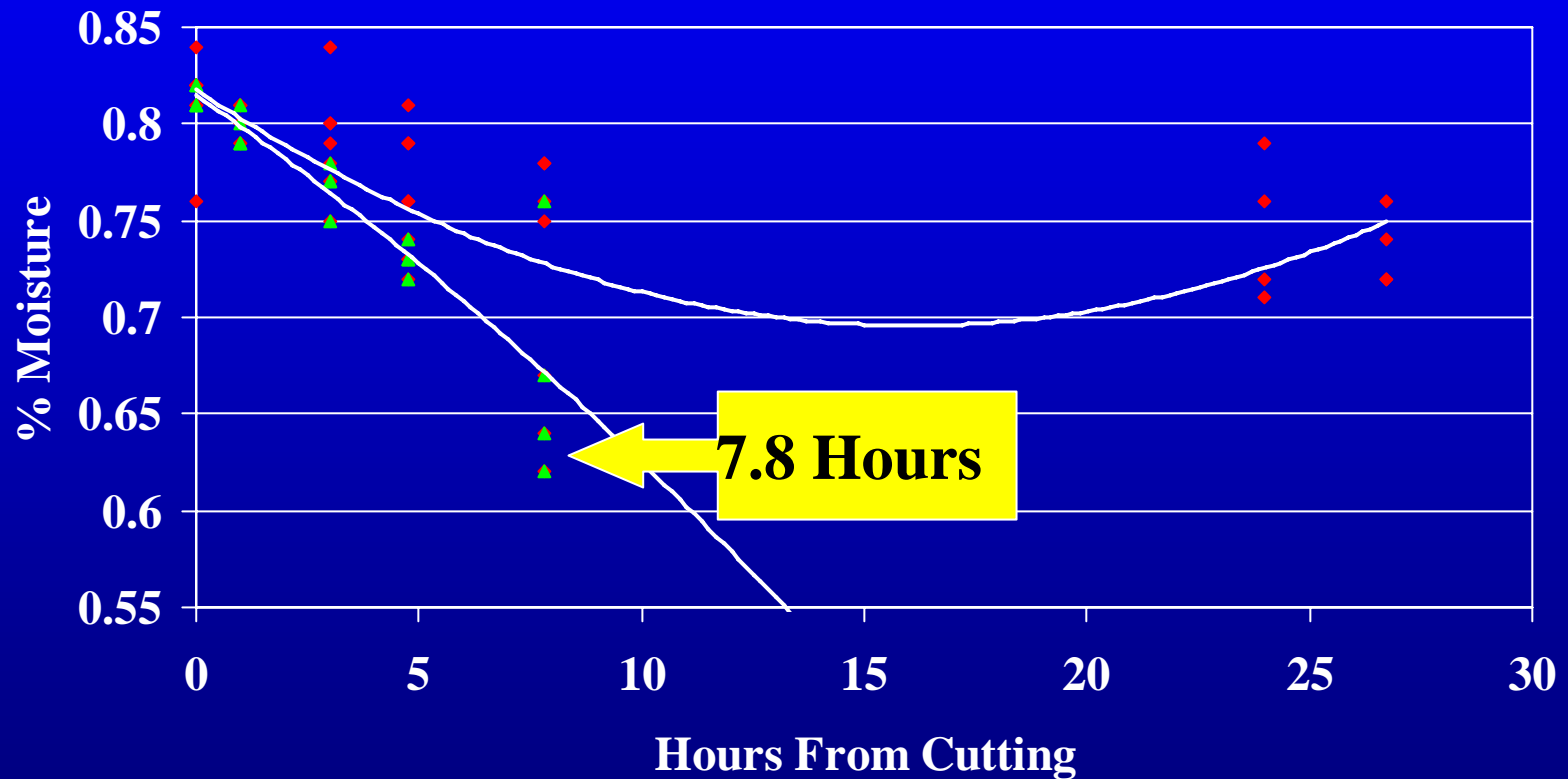


Width Matters More than Conditioning – Grass – Swath Not Moved



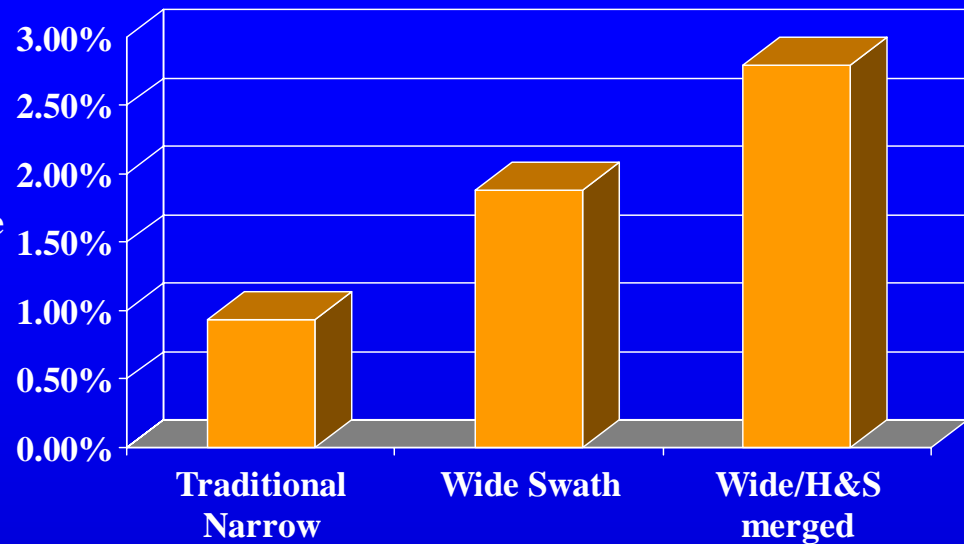
1st Cut Alfalfa

Poor Drying Conditions/ Swath Not Moved

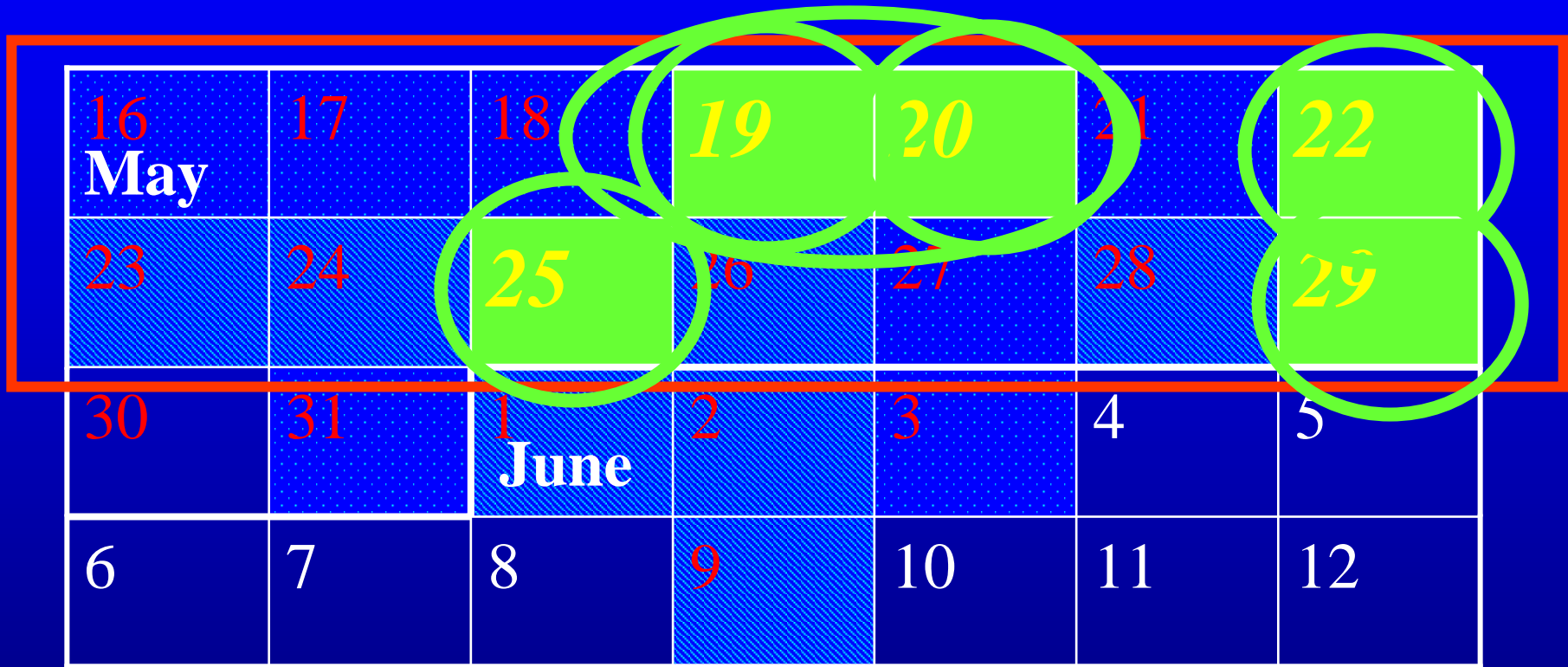


Moisture Removal Rate/Hour

% Moisture
removed/hr



1st Cut Harvest Window



Light rain



Heavy rain

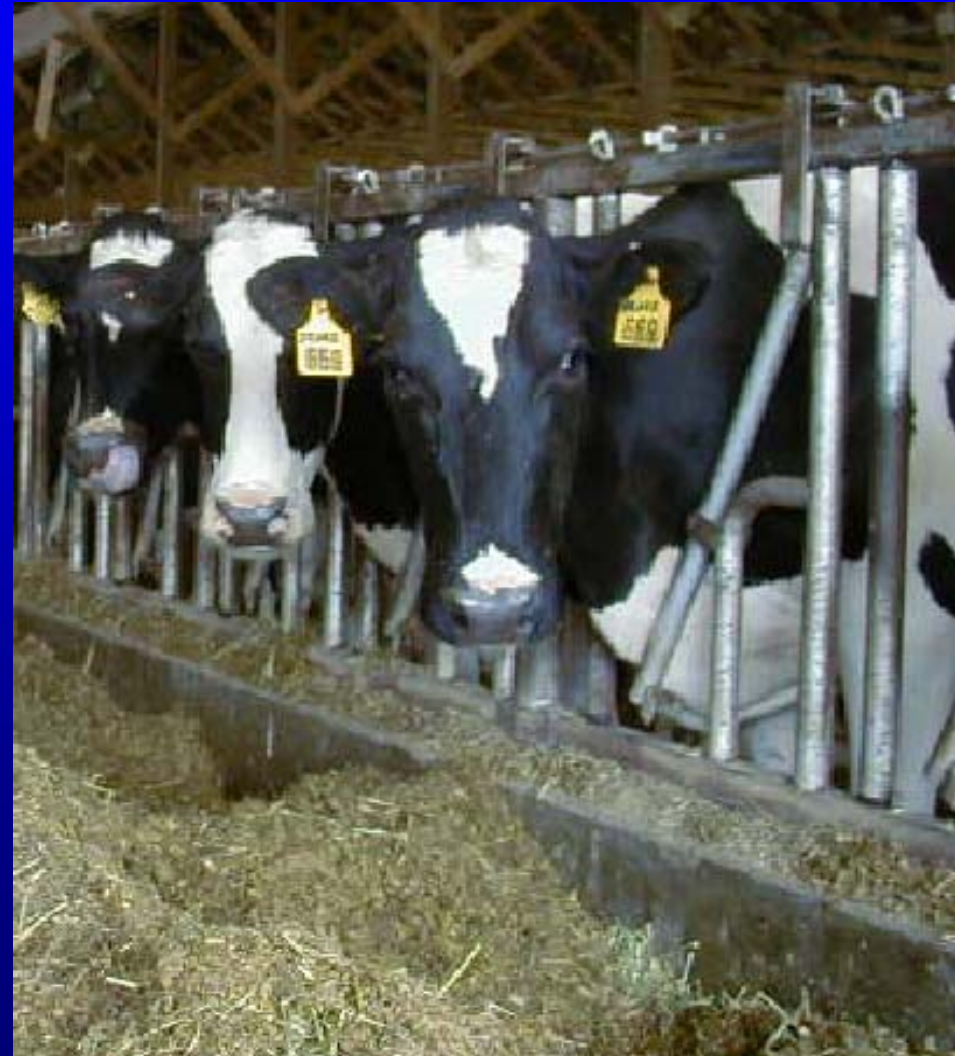


No rain

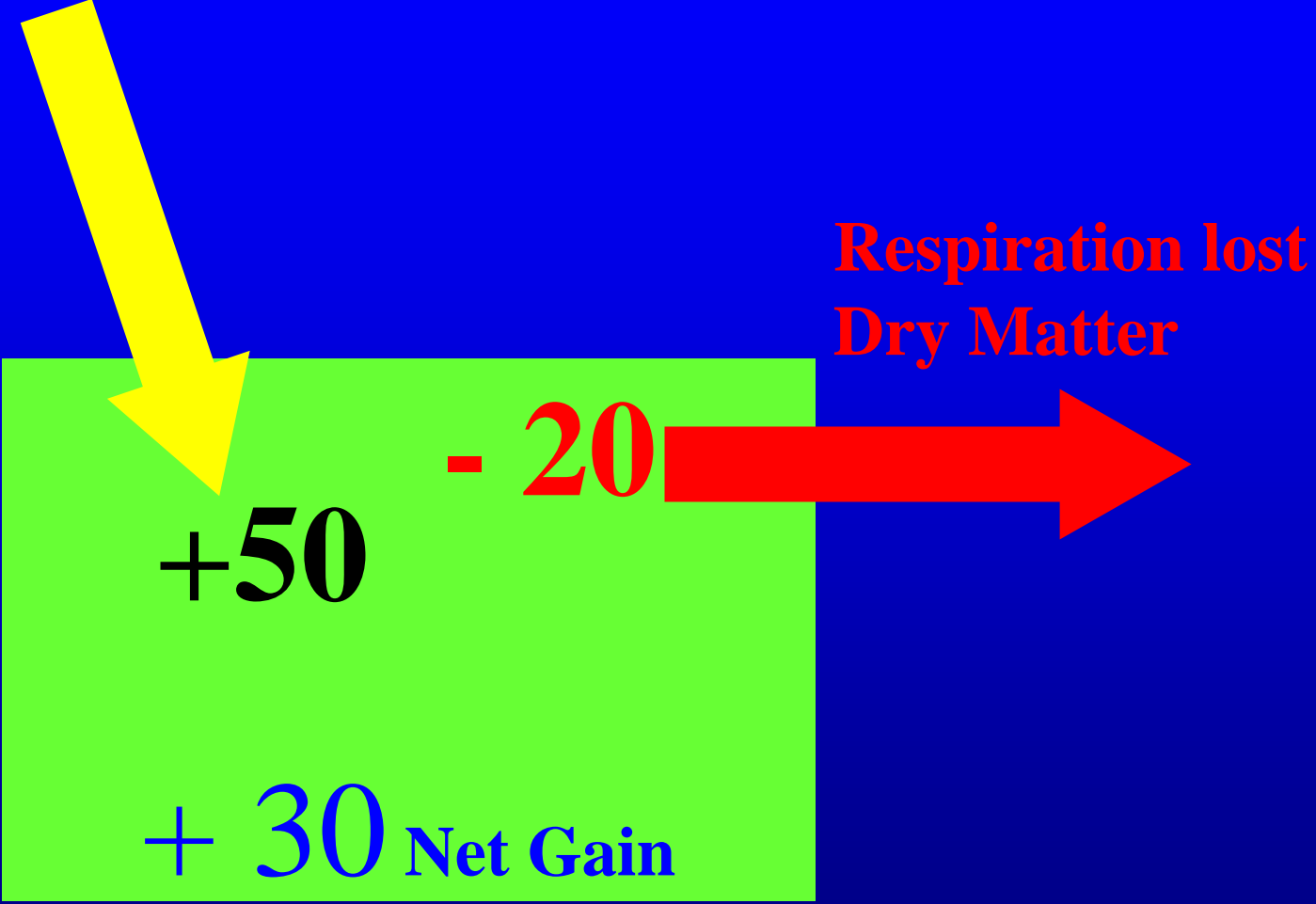


What Quality Reaches the Cow's Mouth

- Wide Swath Makes a Difference!!



Sunshine Produced Dry Matter



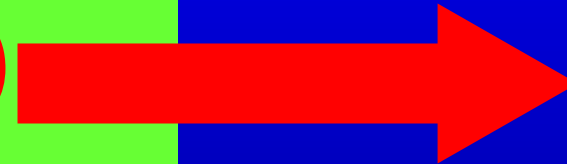
Sunshine Produced Dry Matter



Shade or
Nighttime

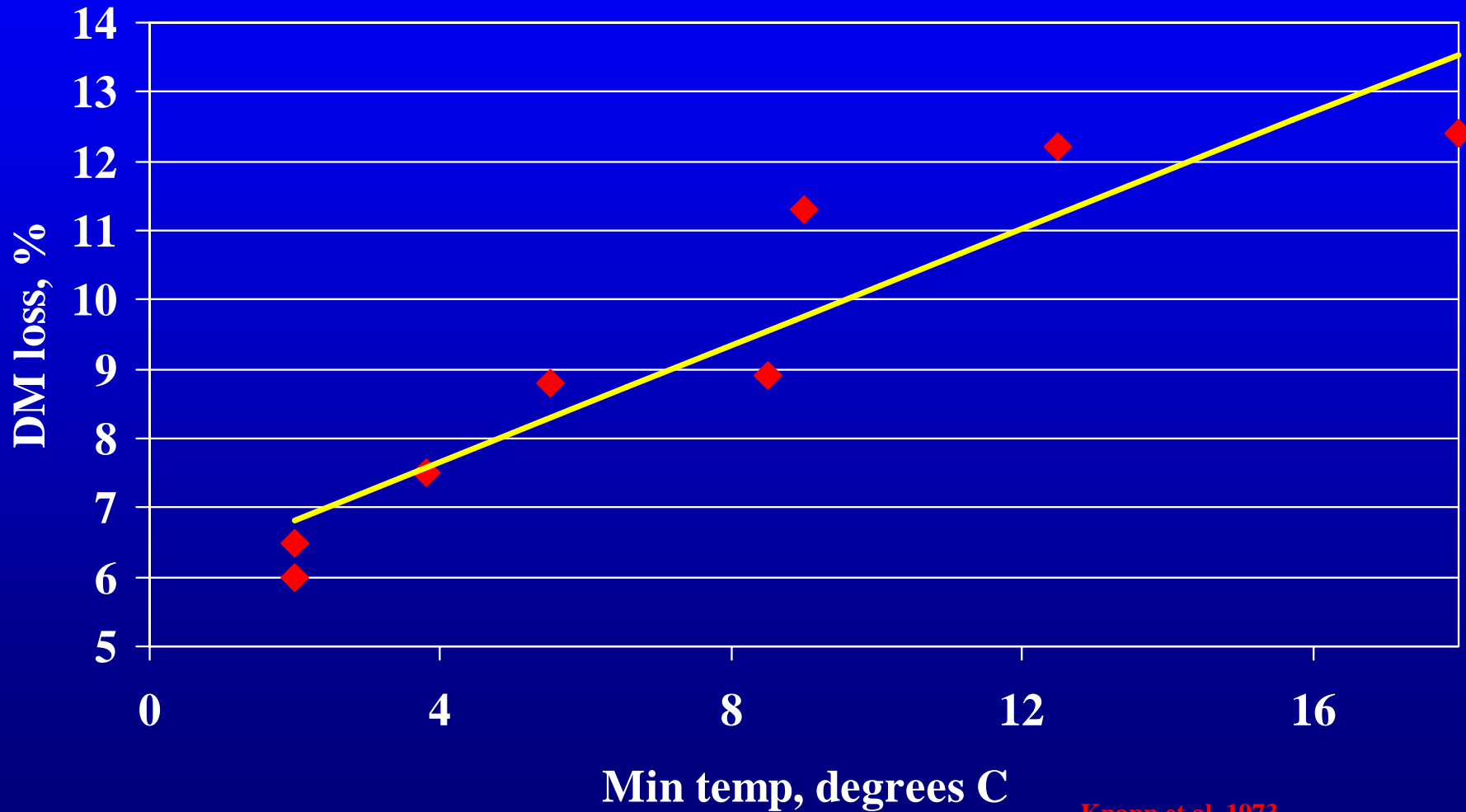
Respiration lost
Dry Matter

- 20



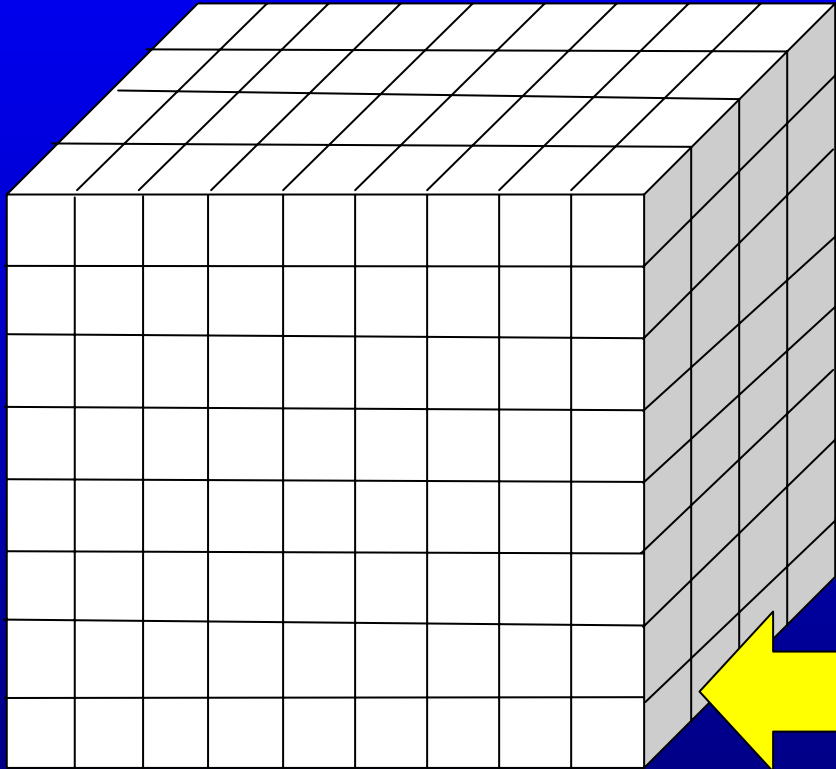
-20 Net Loss

Relationship between overnight DM loss and minimum night temps

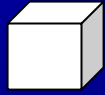
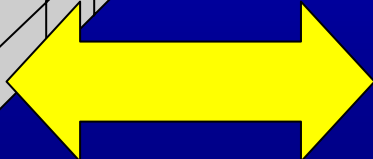


Knapp et.al. 1973

-24%



Starch 2000 to 220,000 sugar units. Moser 1995



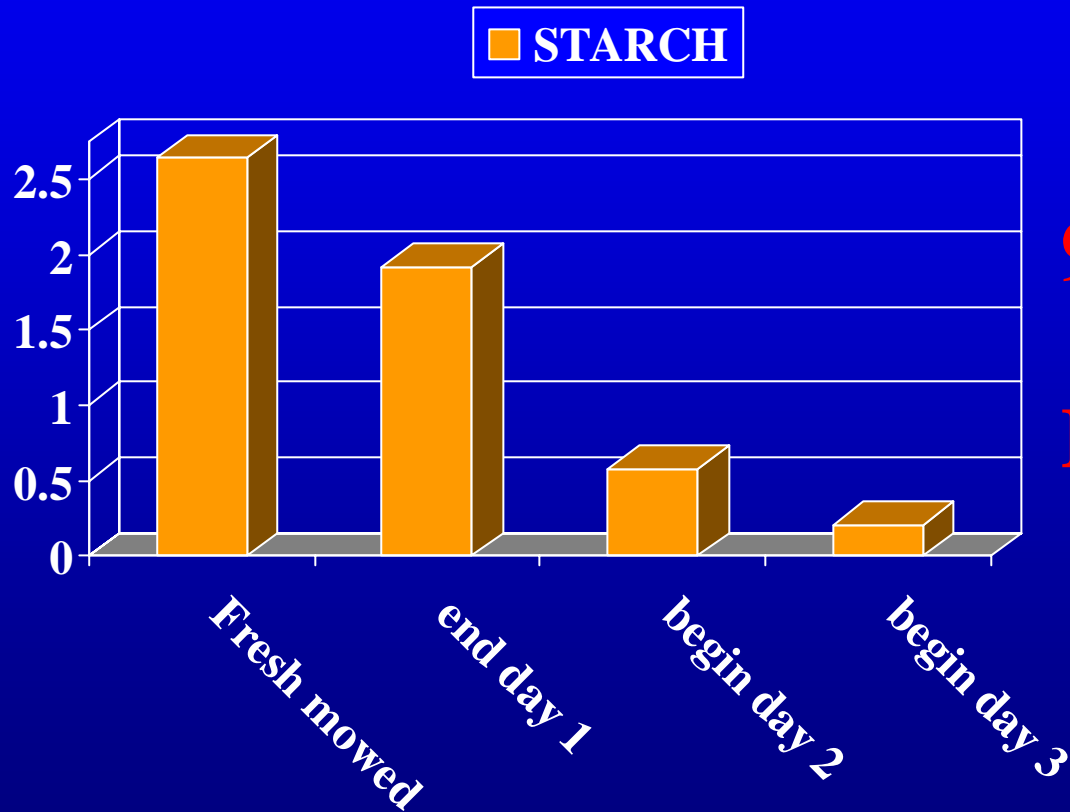
Sugar

-11%

Respiration loss

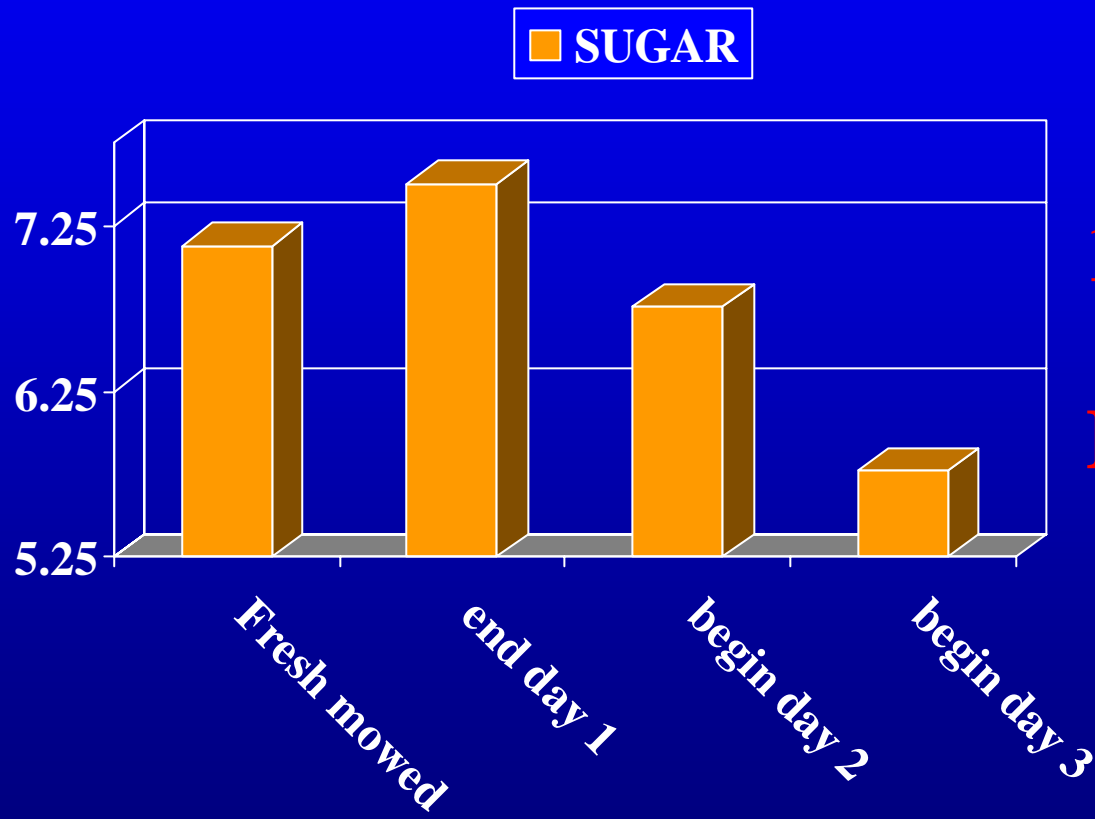


Starch lost- Traditional Narrow Swath



**92% Starch lost
By 3rd Day**

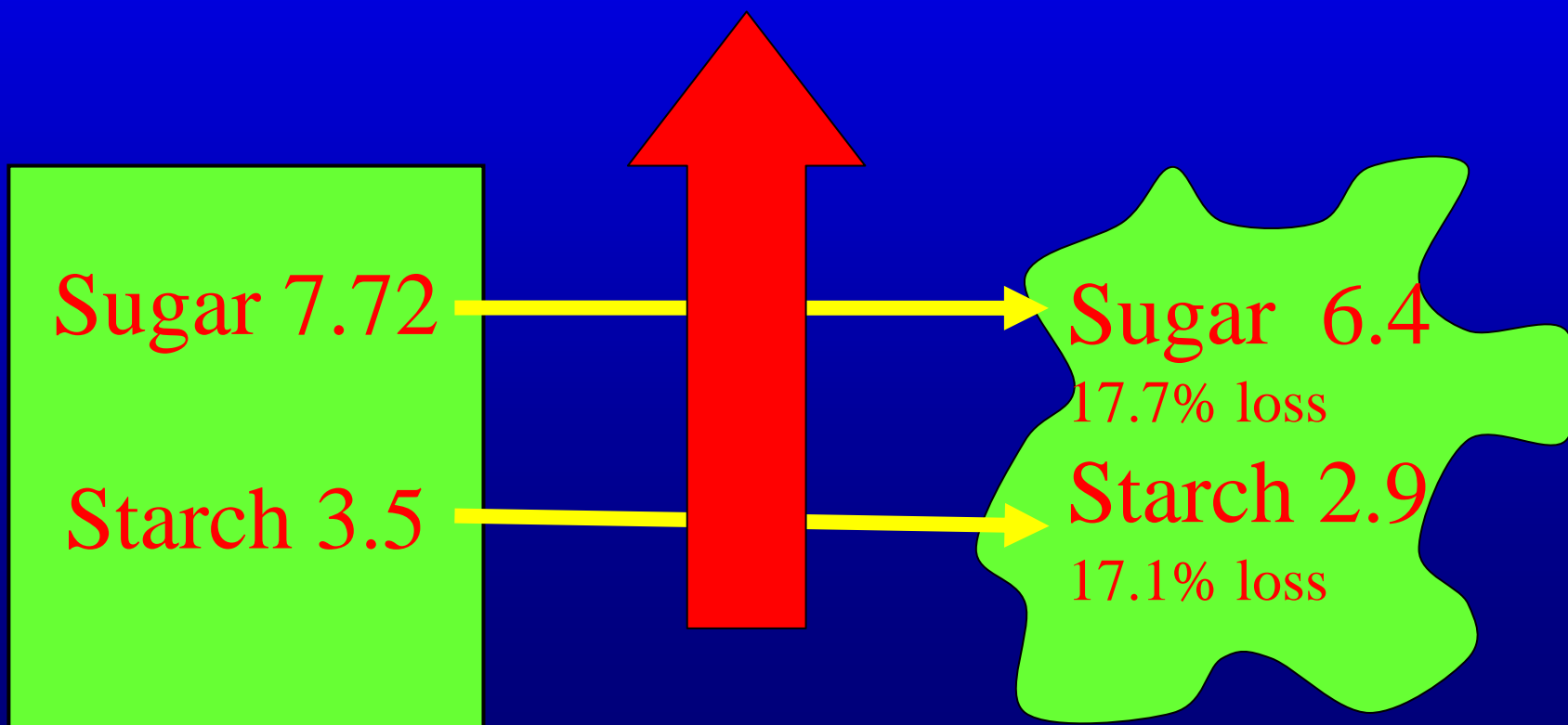
Sugar lost- Narrow Swath



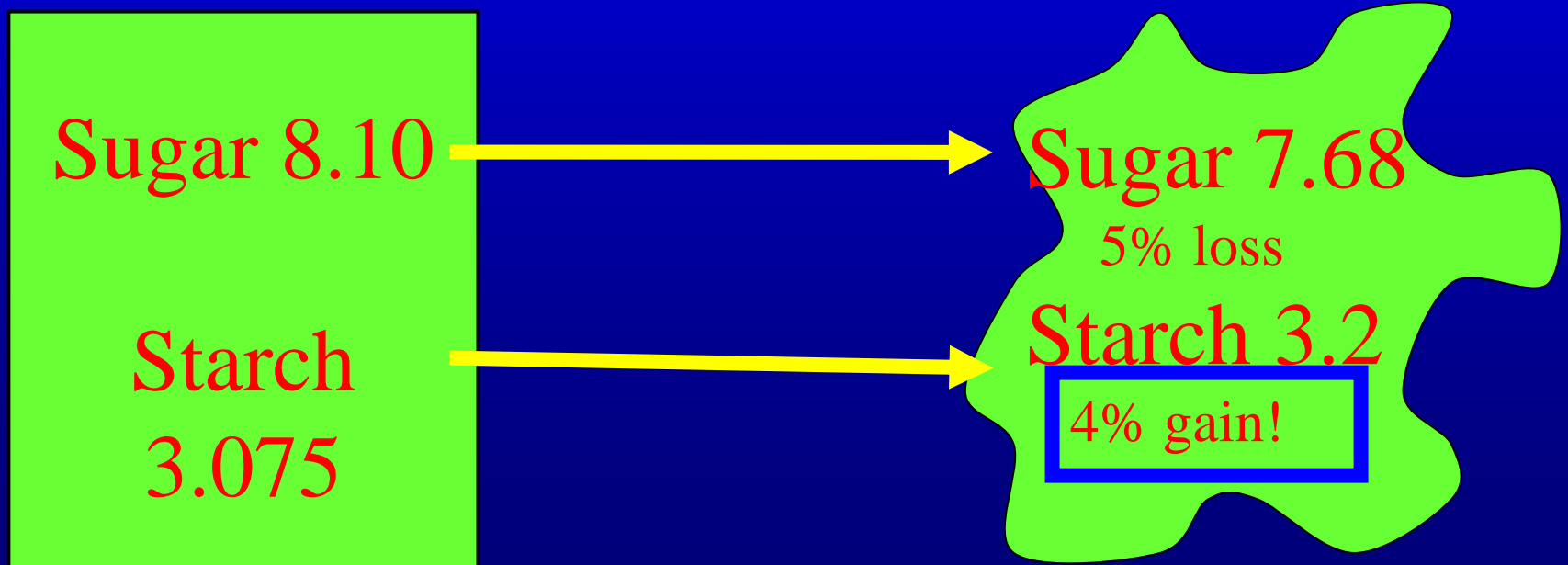
**19% Sugar lost
By 3rd Day**

Narrow Swath Milk loss From Respiration in just 24 hours

16% - 30% of Dry Matter loss by Respiration



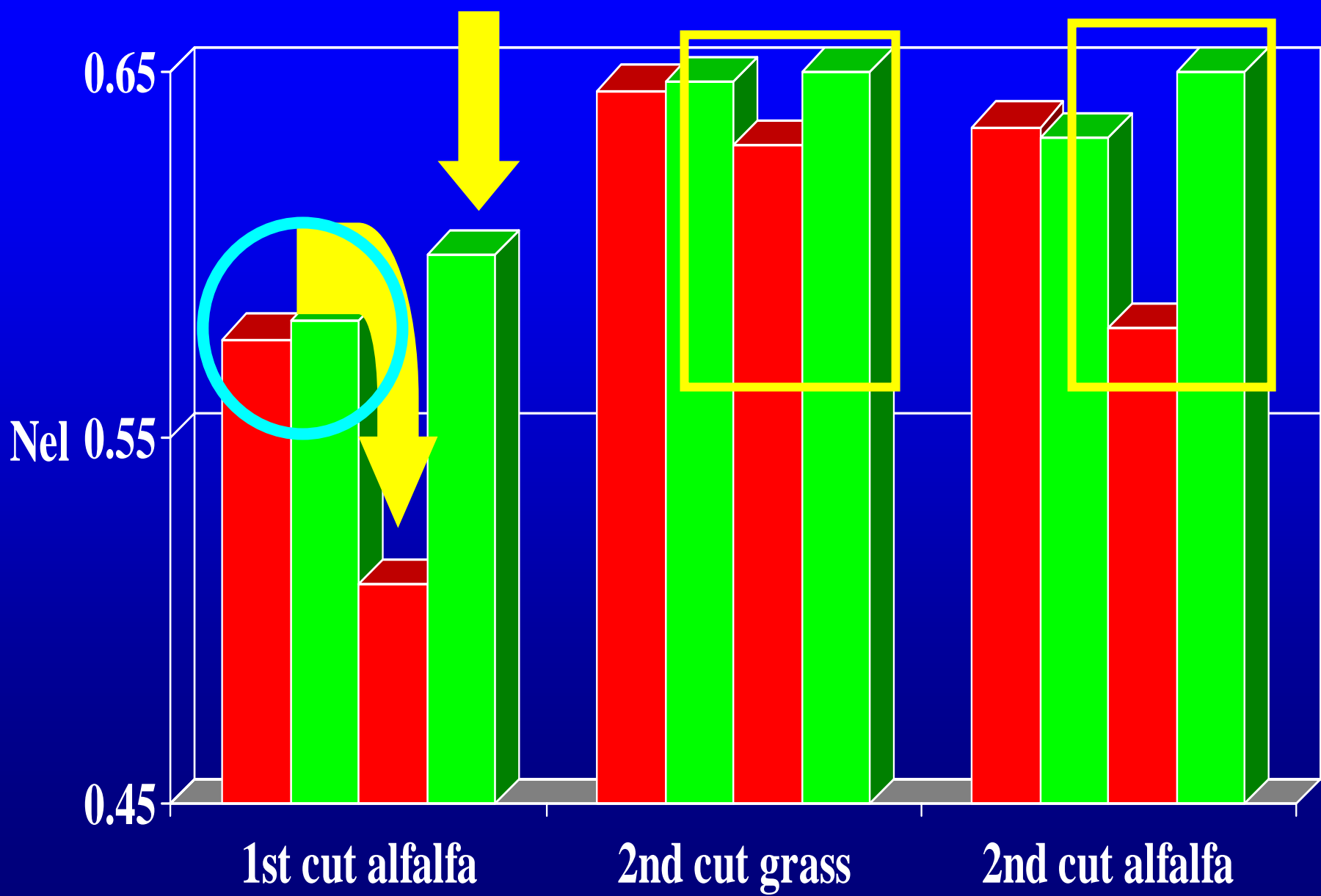
Wide swath

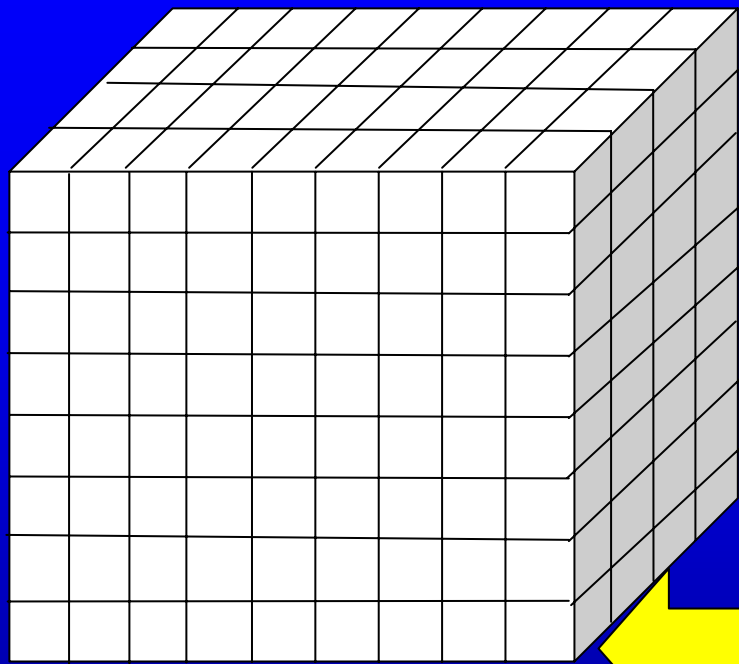


**More Sugar
& Starch =
Better
Fermentation**

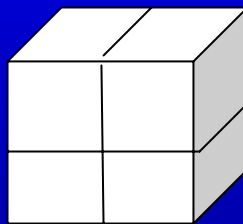
		LACTIC/ACETIC RATIO
alfalfa	narrow	1.520
	wide	3.105
Grass	narrow	6.67
	wide	9.738
2nd Cut Alfalfa	narrow	3.888
	wide	5.940
BMR	narrow	0.890
	wide	1.143

■ Narrow Fresh ■ Wide Fresh ■ Narrow Wilt ■ Wide Wilt



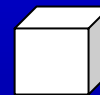
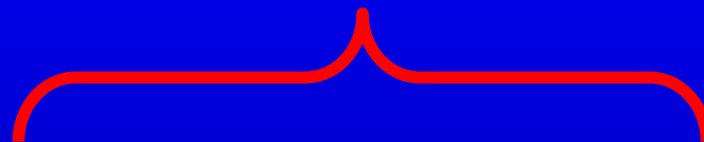


Protein (made of amino acid units)



**Amino
acid**

Soluble Protein



NPN

Impact of Drying Time on Forage NPN

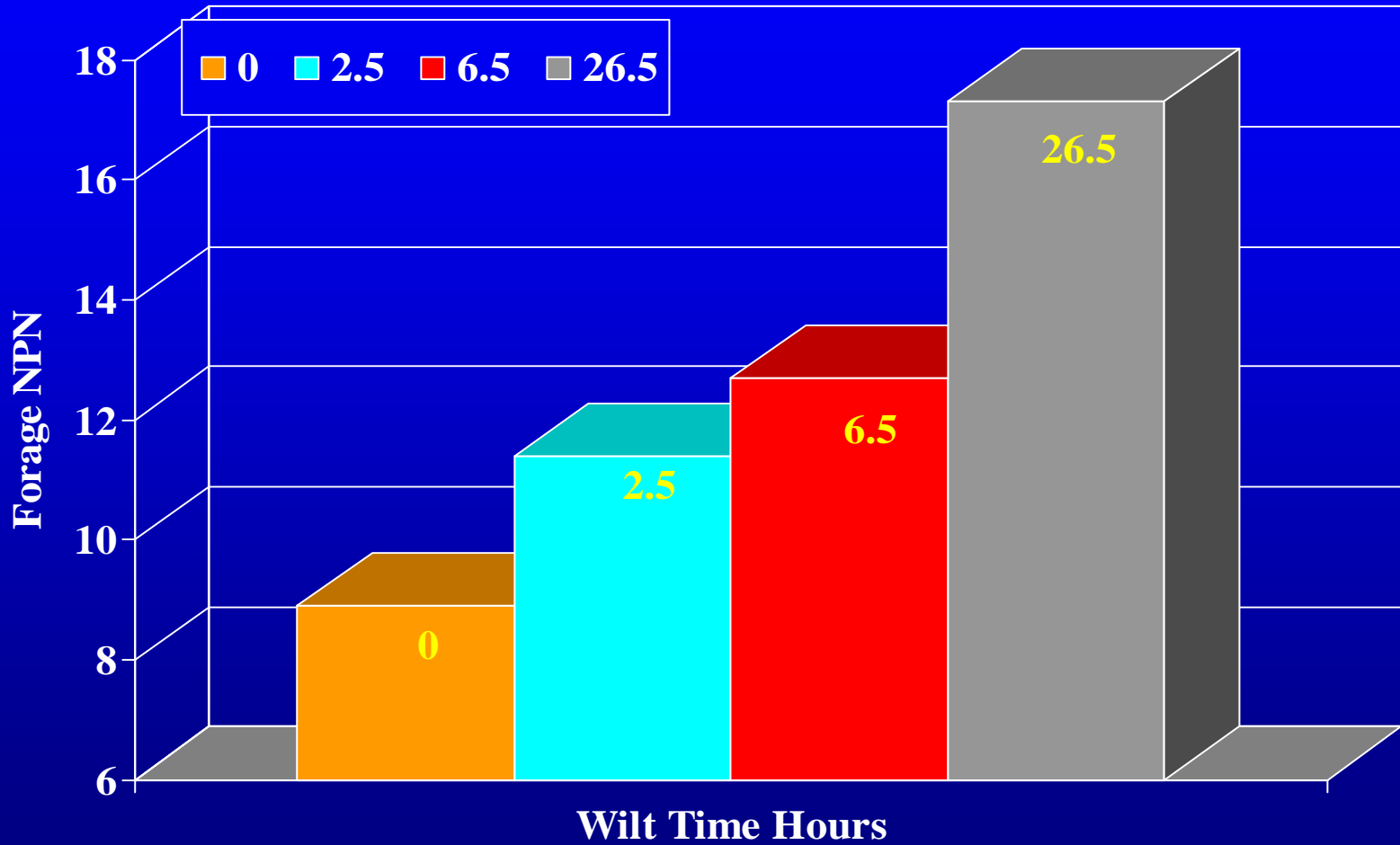


Table from Brady, 1960

Impact on Potential Milk/Ton

	1st Cut Alfalfa	2nd Cut Grass
Narrow Fresh	2652 a	3513 a
Wide Fresh	2731 a	3606 a
Narrow Ferment	2279 b	3400 b
Wide Ferment	2574 a	3705 a
lbs potential Milk/ton	294.9	304.5
\$/ton DM	\$44.24	\$45.68

275 Acres x 3 T DM/A x \$40/T = \$33,000



- **Reduces time & cost**
- **Fits quality harvest window**
- **Gives you more milk/ton**

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New York Farm Viability Institute

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