



# Rate of Yield and Quality Change in Alfalfa

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# Harvest management - it's come a long way...

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<b>Time</b>	<b>Goal</b>	<b>No. harvests</b>	<b>Growth stage</b>
<b>1920-1950</b>	<b>Persistence, yield</b>	<b>1 – 2</b>	<b>Full flower</b>
<b>1950-1960</b>	<b>Nutrient yield, persistence</b>	<b>3</b>	<b>First flower</b>
<b>1970's</b>	<b>Nutrient yield</b>	<b>4</b>	<b>First flower</b>
<b>1980's</b>	<b>Nutrient conc.</b>	<b>4</b>	<b>Bud</b>

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*Sheaffer, 1990*

## ...but so has alfalfa variety development.

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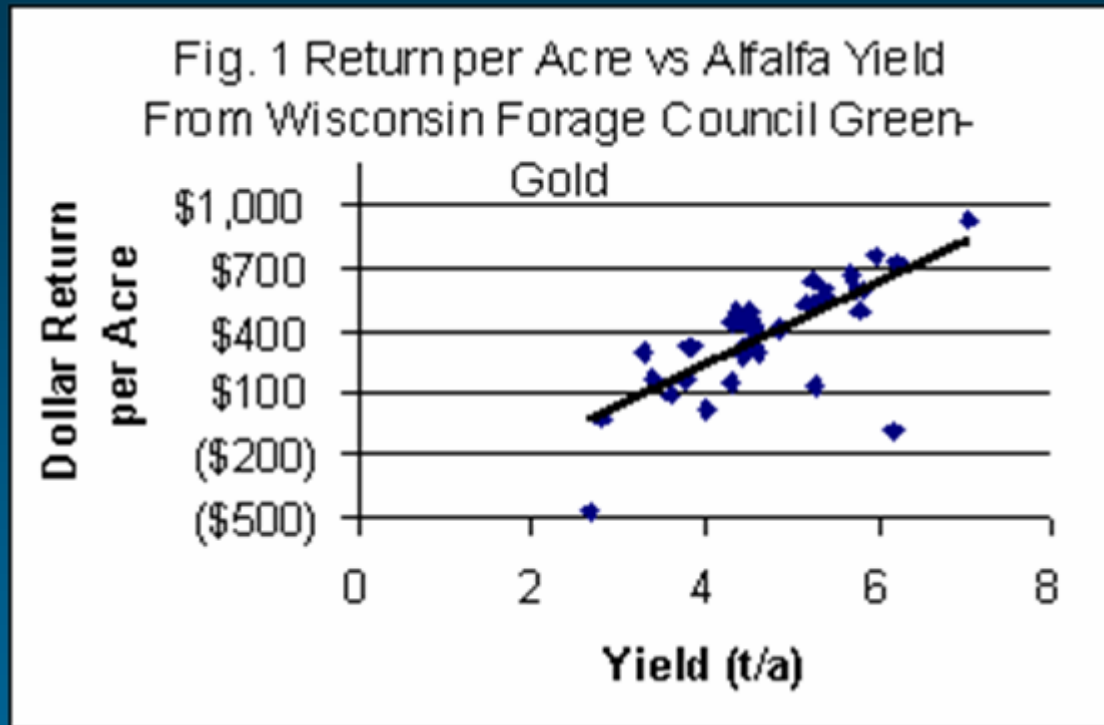
<b>Period</b>	<b>No. released/year</b>	<b>Source</b>
<b>1901 - 1940</b>	<b>0.33</b>	<b>Public</b>
<b>1941 - 1960</b>	<b>1</b>	<b>Public/private</b>
<b>1981 - 1985</b>	<b>17</b>	<b>Private/public</b>
<b>1986 - 1990</b>	<b>30</b>	<b>Private</b>
<b>1991 - 1995</b>	<b>60</b>	<b>Private</b>
<b>1996 - 2000</b>	<b>100</b>	<b>Private</b>

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*USDA-ARS Alfalfa Crop Germplasm Comm., 2000*

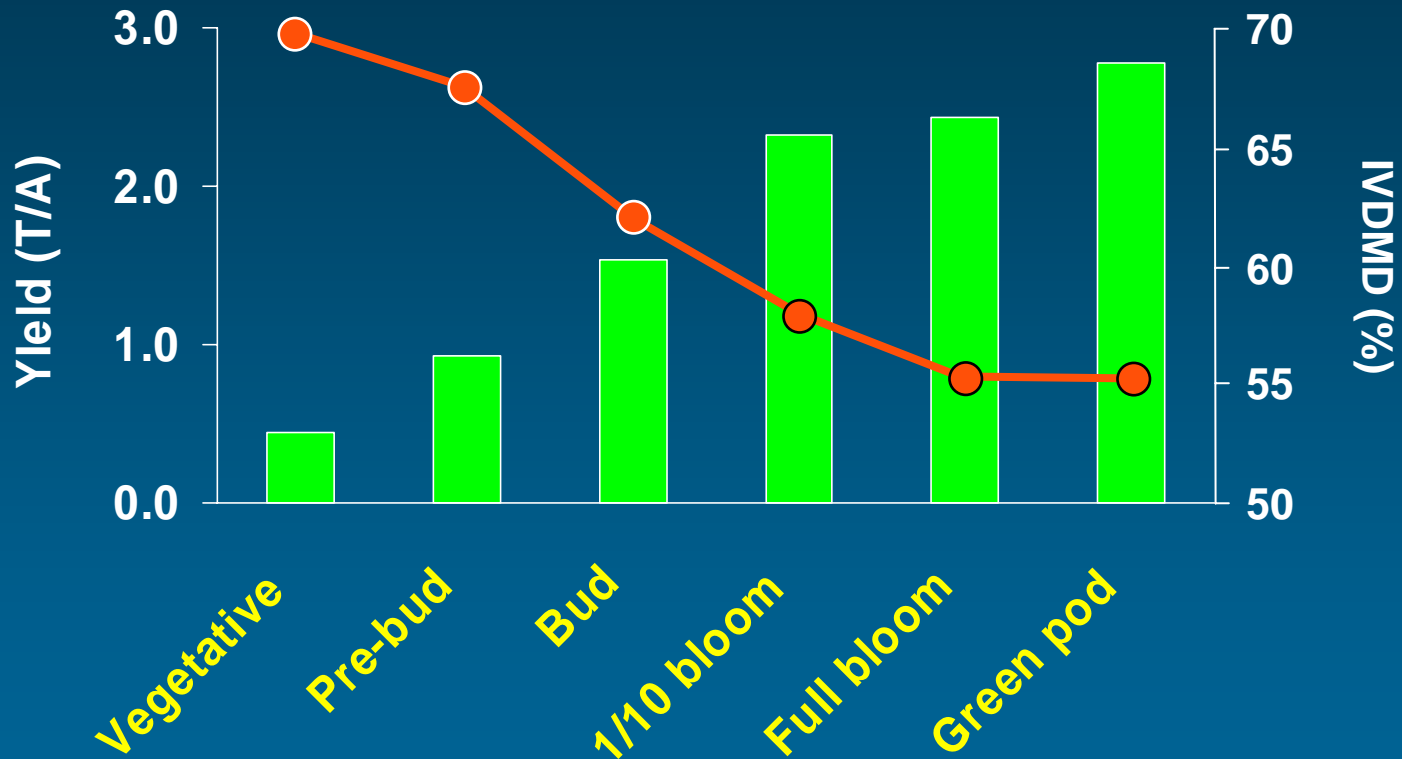
# Harvest for yield or quality?

Greater yield  
returns more  
profit,



*Undersander, 2001*

# BUT yield and quality are opposed.



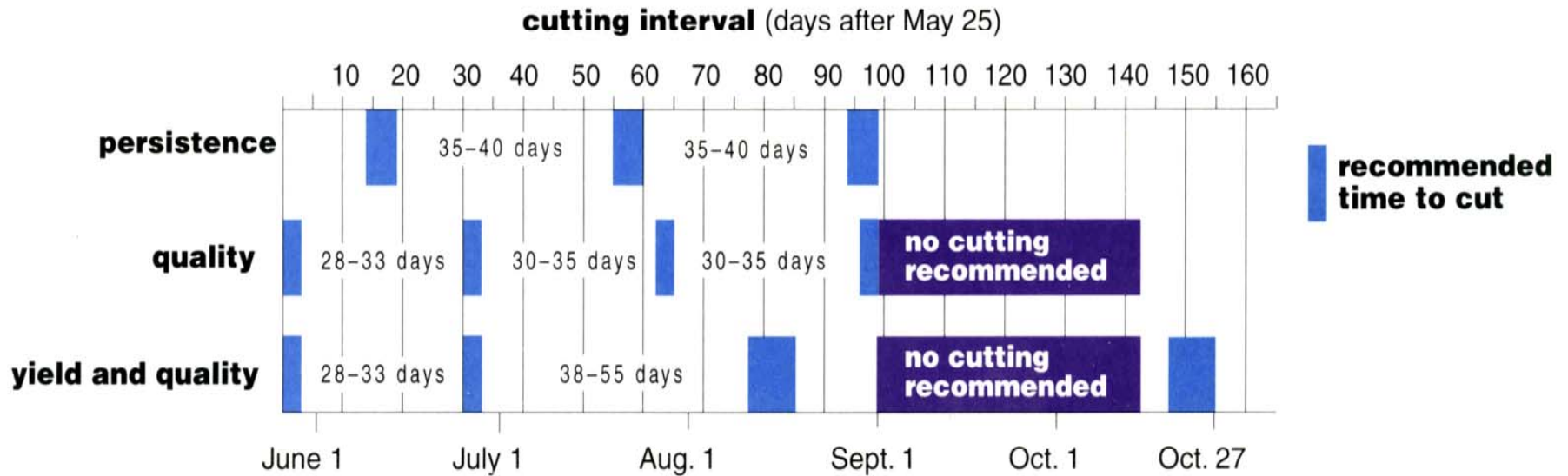
Smith, 1960

# Harvest for yield or quality?

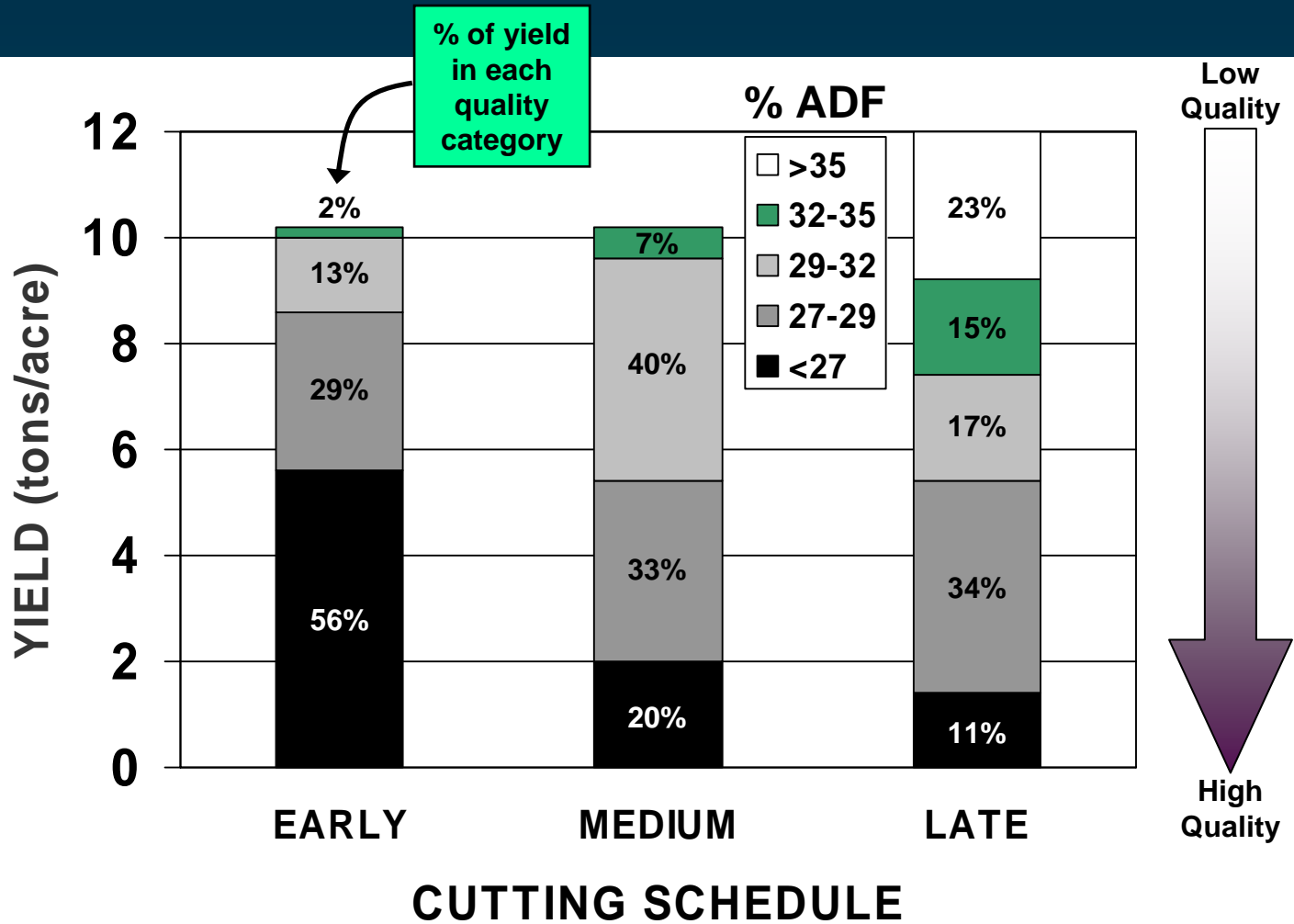
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- Alfalfa should be harvested at the quality that meets the dietary needs of the animals that will consume it, and is balanced with respect to other components of the diet.

# Management goals dictate cutting date and interval.



*Undersander et al., 2004*

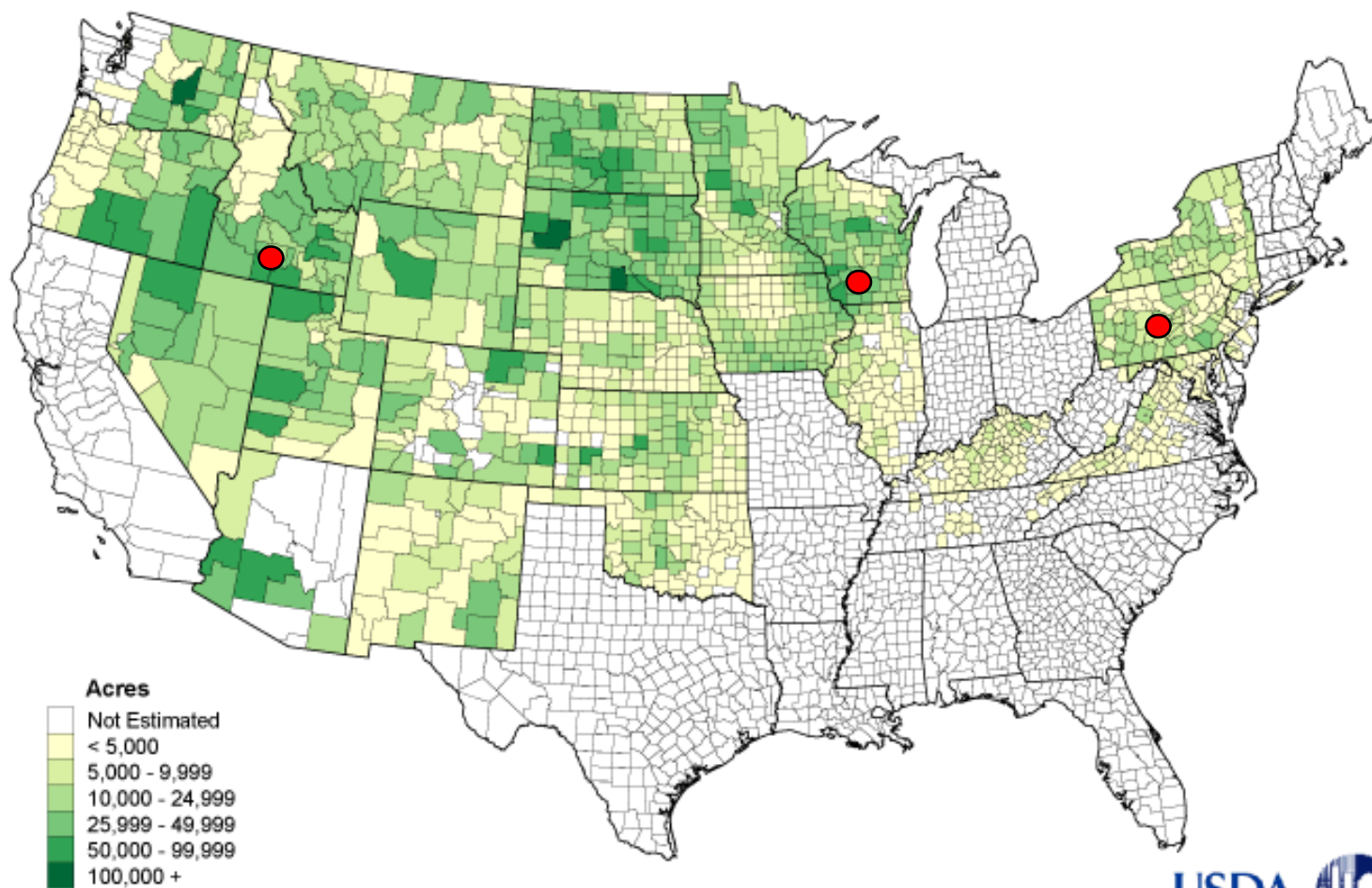




**What is the trade-off between yield and quality during each harvest period?**



## Alfalfa Hay (Dry) 2004 Harvested Acres by County



# Locations



southcentral Idaho



central Pennsylvania



southcentral Wisconsin

<b>Variety</b>	<b>Source</b>	<b>Advertised traits</b>
<b>Affinity+Z</b>	<b>ABI</b>	<b>disease resistance, fall dormancy 4, full season, fast recovery, traffic tolerance</b>
<b>Standfast</b>	<b>CalWest</b>	<b>lodging resistance, fall dormancy 4/5, fast recovery (reach late bud 3 - 5 days faster)</b>
<b>WL-346</b>	<b>WL Research</b>	<b>insect/disease resistance, fall dormancy 4, fast recovery</b>

## Yield - quality relationships in spring

0 d

5 d

10 d

15 d

20 d



Early summer



Late summer



Fall



## Yield - quality relationships in early summer

0 d

5 d

10 d

15 d

20 d



Spring



Late summer

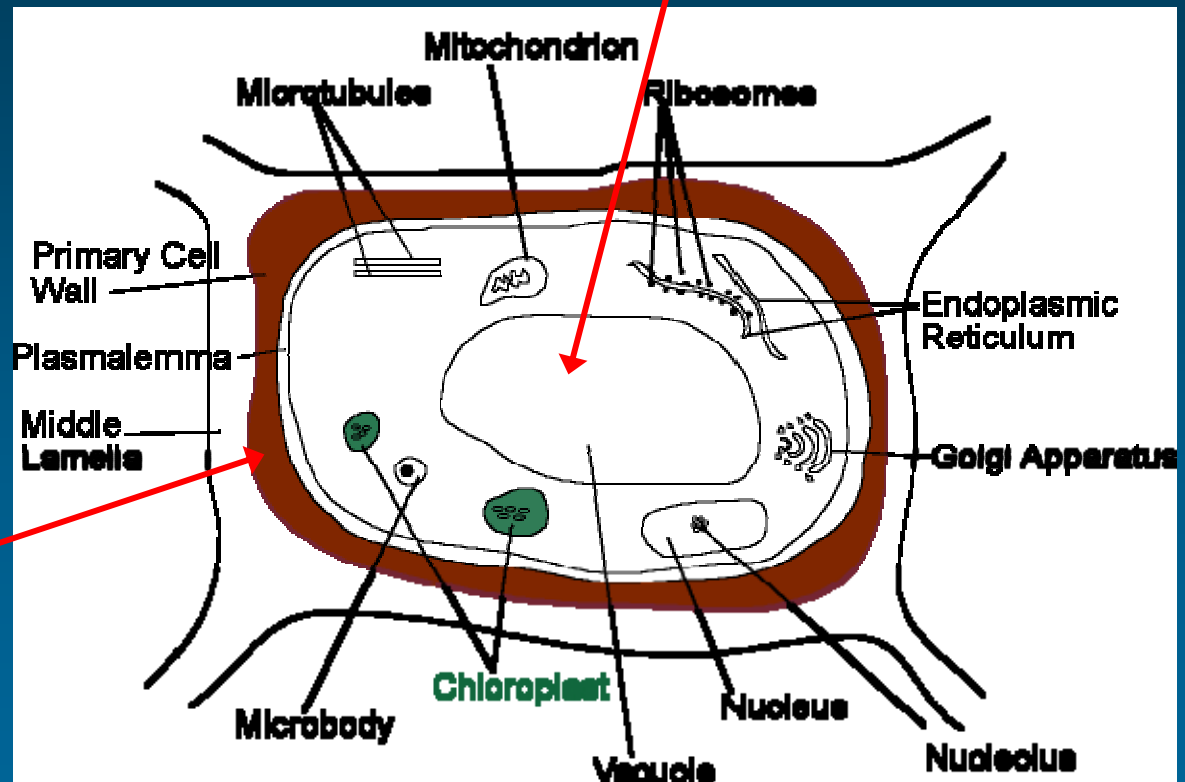


Fall



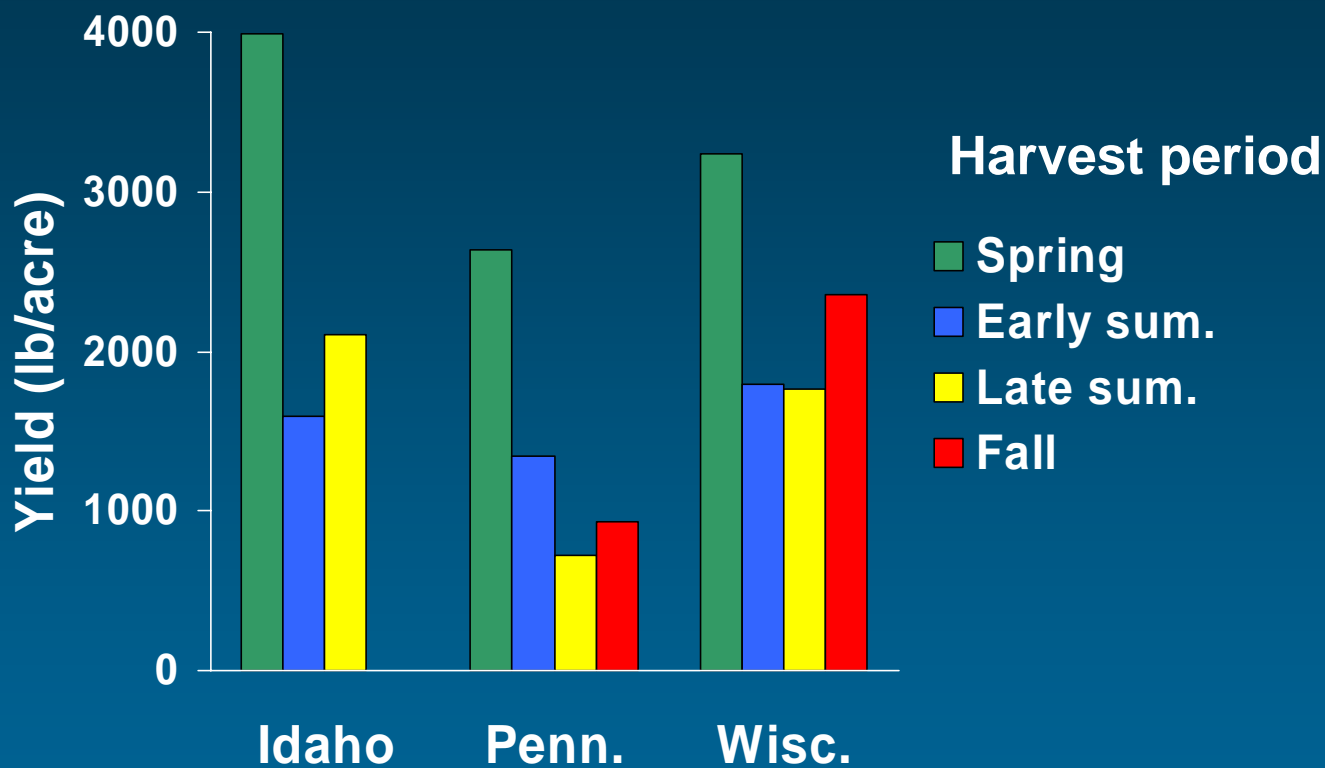
# Forage quality perspectives

completely digestible



partially digestible

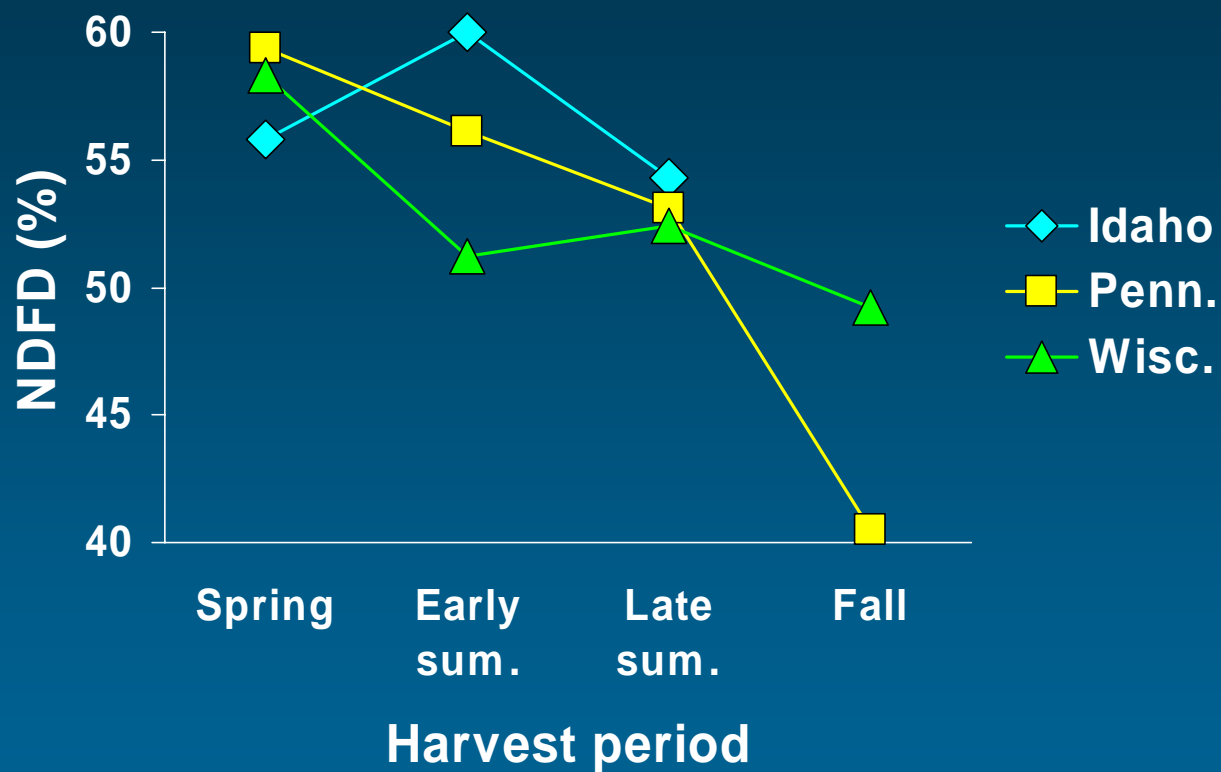
## 1<sup>st</sup> cut yield for each harvest period \*



\* No differences found among varieties

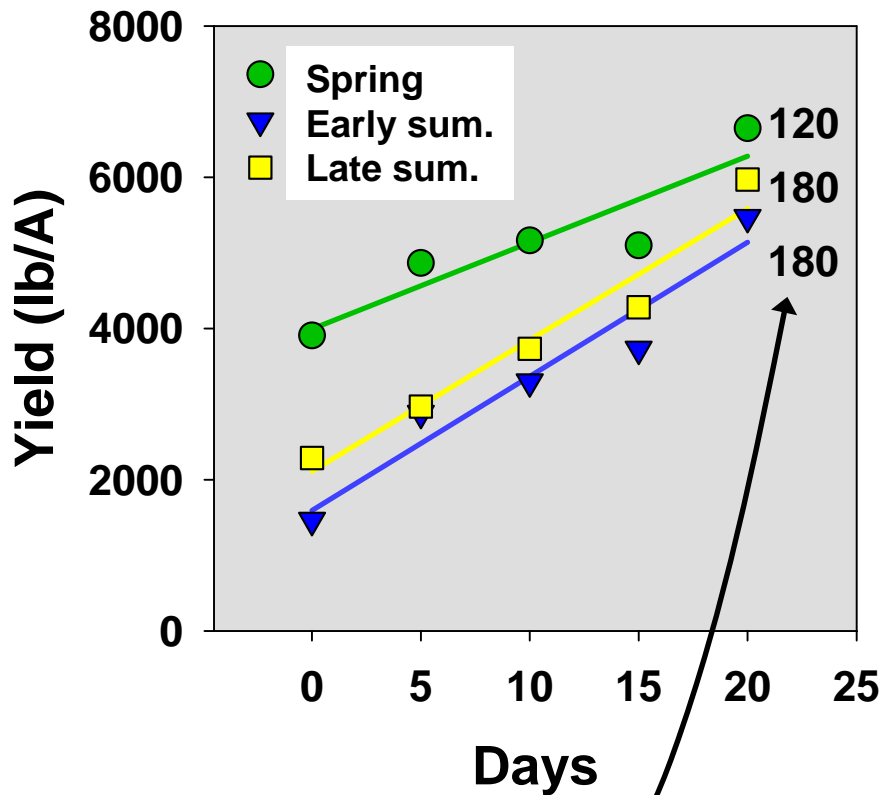


# 1<sup>st</sup> cut NDFD for each harvest period \*

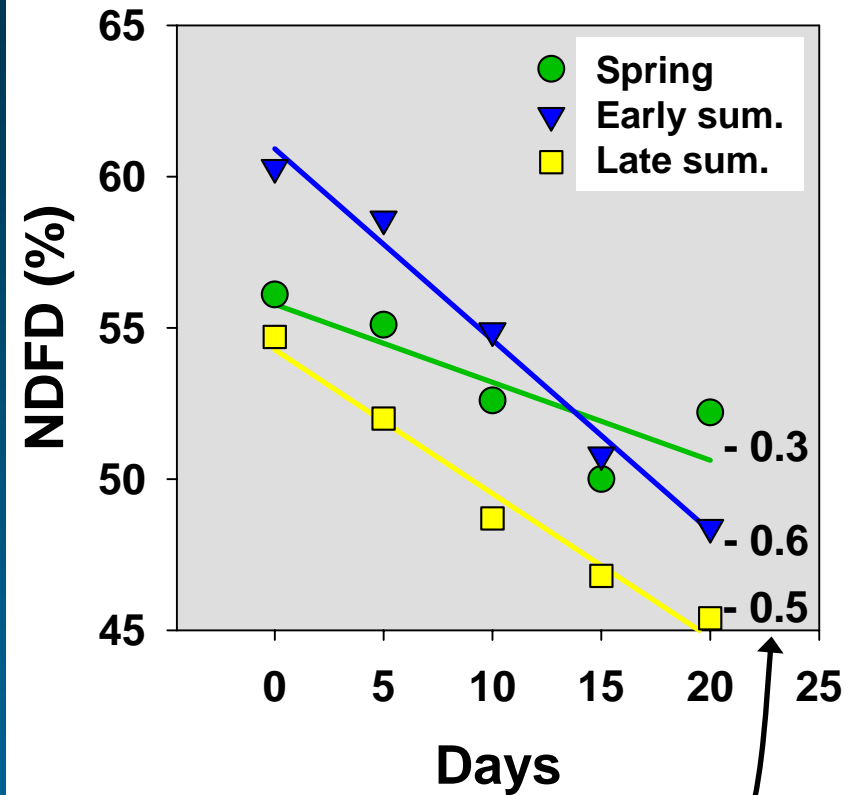


\* No differences found among varieties

# Idaho: yield vs. cell wall digestibility

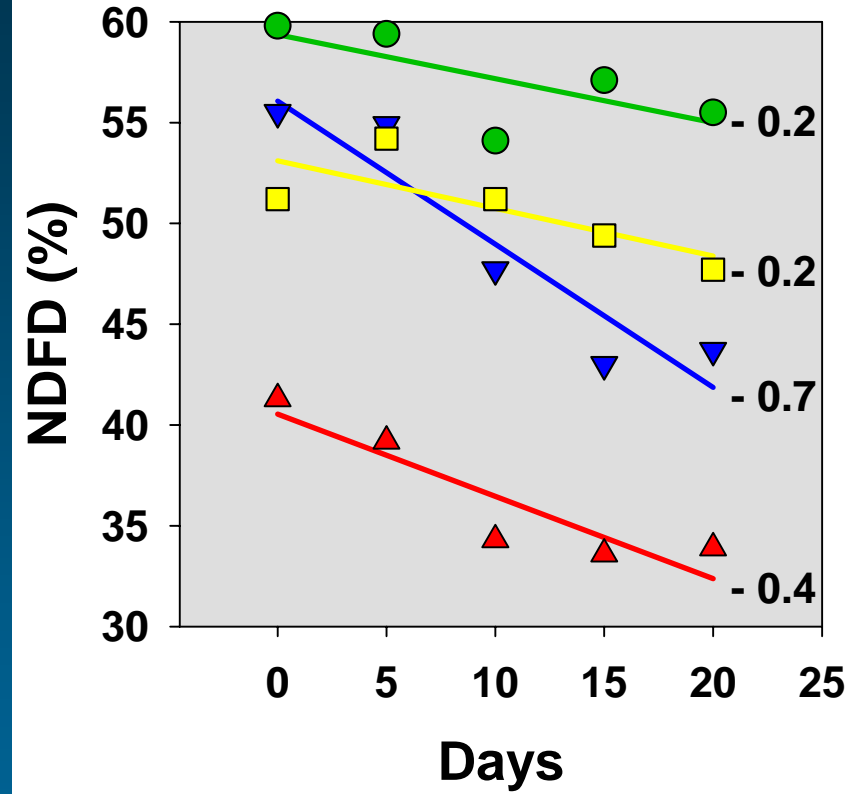
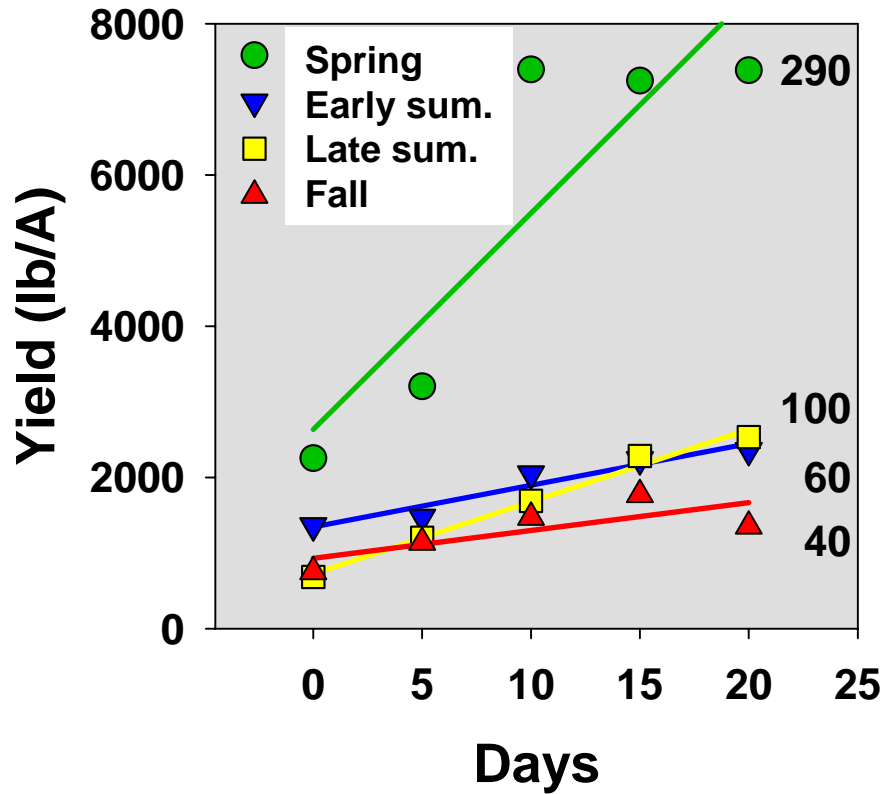


Change in yield (lb/acre) per day

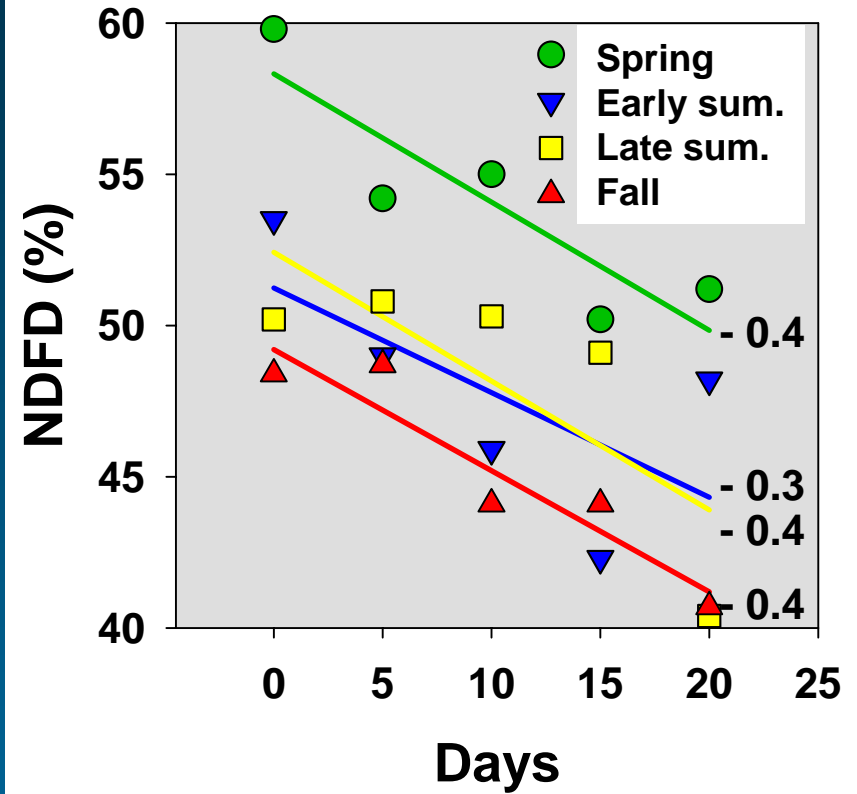
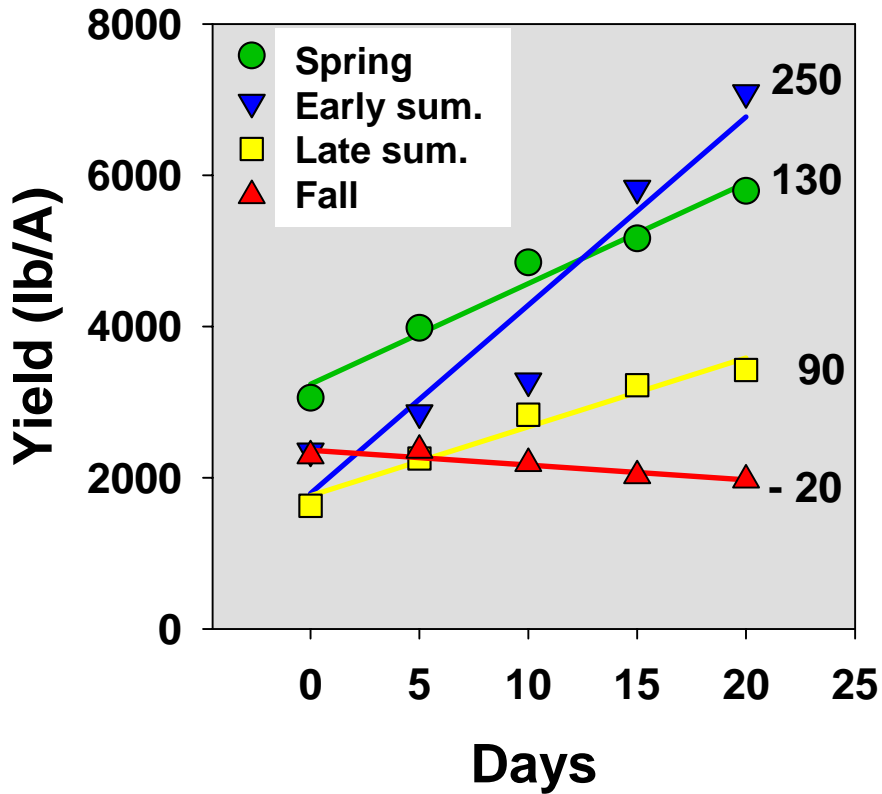


Change in NDFD (%) per day

# Pennsylvania: yield vs. cell wall digestibility



# Wisconsin: yield vs. cell wall digestibility



Where does harvest management have the most impact?

Harvest period	lb forage grown per % increase in NDF		
	ID	PA	WI
Spring	910	640	230
Early sum.	500	250	590
Late sum.	610	150	200
Fall	-	100	- 50

**More yield is impacted by forage quality changes that occur early in the growing season.**

**Questions or comments?**

