

Effect of artificial ordering on TSNAs during short term storage

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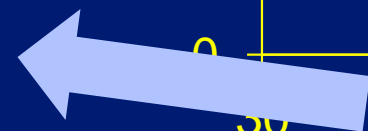
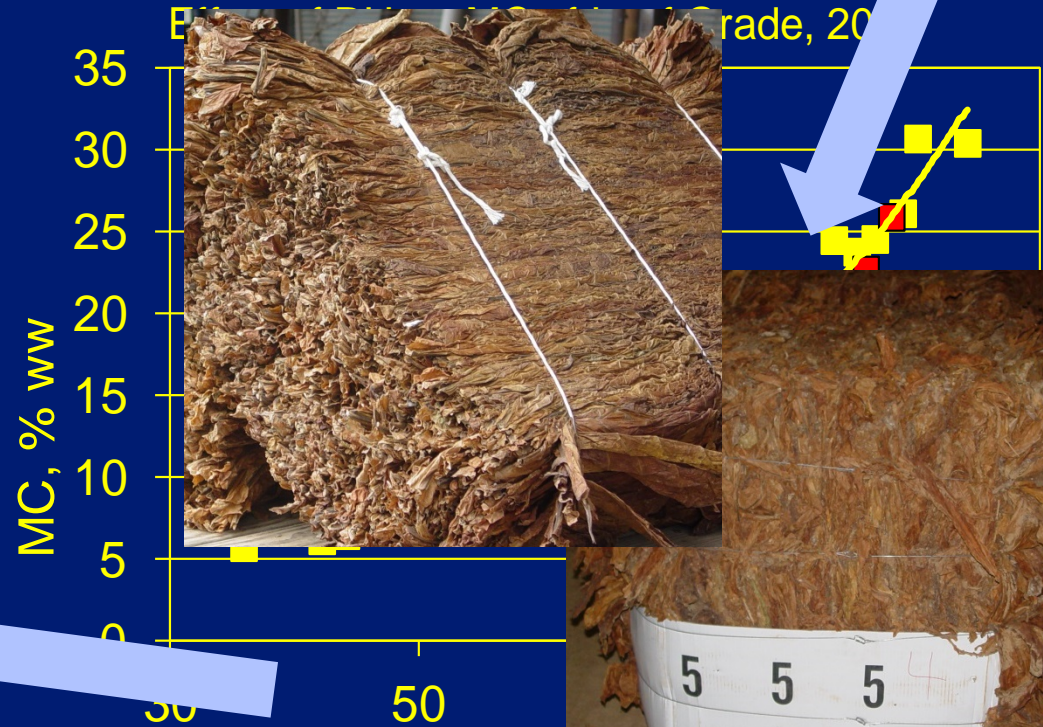
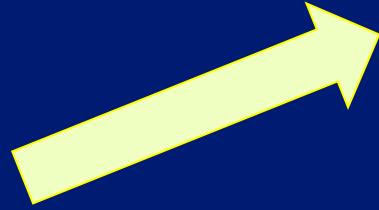
TSNA increases during storage:

- moisture content
- temperature
- time
 - leaf chemistry

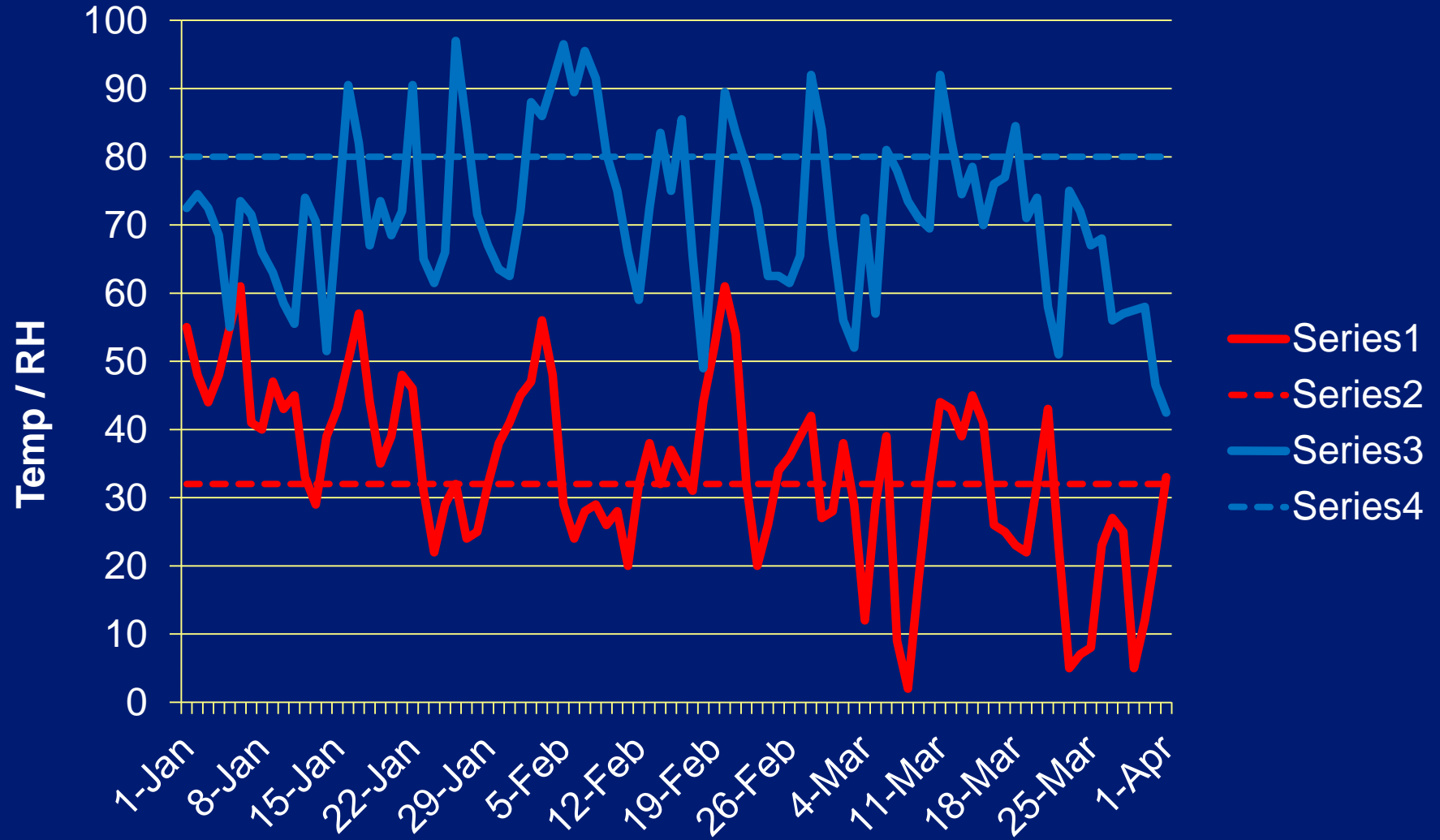
During on-farm short term storage <14 days

- between takedown and stripping
- after artificial ordering?

Market preparation:



Daily average temperature and relative humidity November 2013 – Jan 2014



2011-2012 Kentucky/Tennessee Burley Production Guide:

TSNAs in Burley and Dark Tobacco

“Allow tobacco to come into case naturally if possible, without the use of water sprays.”

Objective of test:

- Test validity of this statement



Ordering Treatments:



Natural
after high
ambient
humidity



Mist

Spray



Humidity
chamber



Steam



<u>Ordering treatment</u>	2010	2011	2012
Natural	X	X	X
Steam	X	X	
Steamed twice			X
Water spray	X	X	
Water mist	X	X	X
Water mist twice			X
70% Humidity			X
80% Humidity			X
<u>Variety</u>			
TN 90H	X	X	X
TN 90LC		X	X

Crop production:

Standard; 200 lb. N/acre; harvested 28 day after topping
4 reps; treatments allocated in field; 8-12 plants/sample

Casing procedure:

1. Takedown when naturally in case
2. “Natural” treatment removed from sticks & bulked immediately
3. Tobacco for all artificial treatments on rail wagon in low humidity environment over night
4. Next day, artificial ordering treatments applied
5. Sampled and bulked

Bulking procedure:

Trim plants on top
Pre-fabricated 6 mil polyethylene liner in frame
Bundle of sampled plants on trim



Trim plants
on left

Trim plants
on right

Heat-sealed

Layer of trim on bottom
Data logger sensor in center
of sample bundle

Measurements:

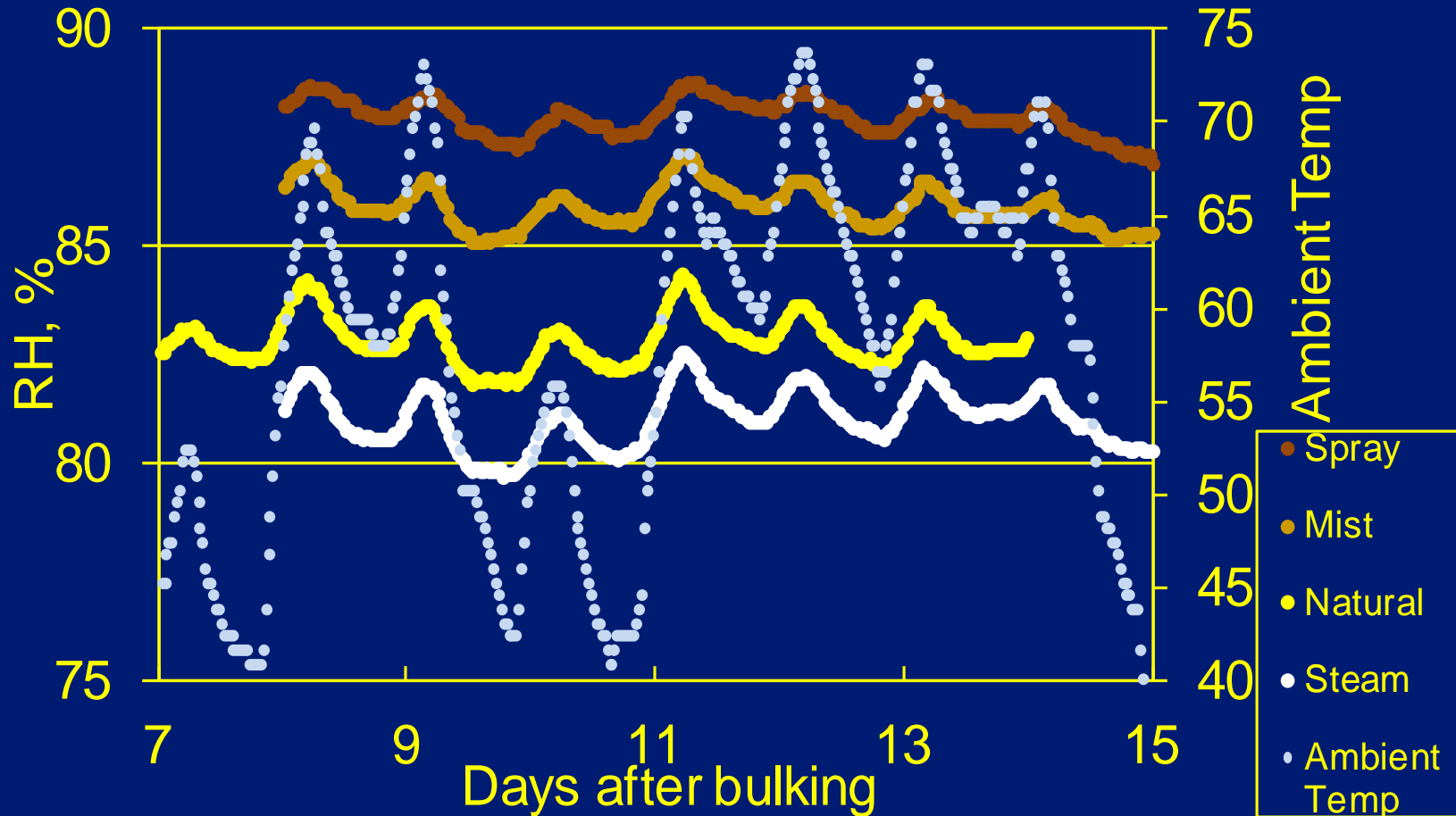
- Moisture content
 - leaf #s 5 – 9, individual plants
- Alkaloids & TSNAs
 - leaf # 4, bulked

- at
- takedown
 - immediately before bulking
 - 14 days in bulk



Results

Equilibrium RH in Bulks, 2010



Moisture Content after 14 d, 2010



Moisture Content after 14 d, 2011

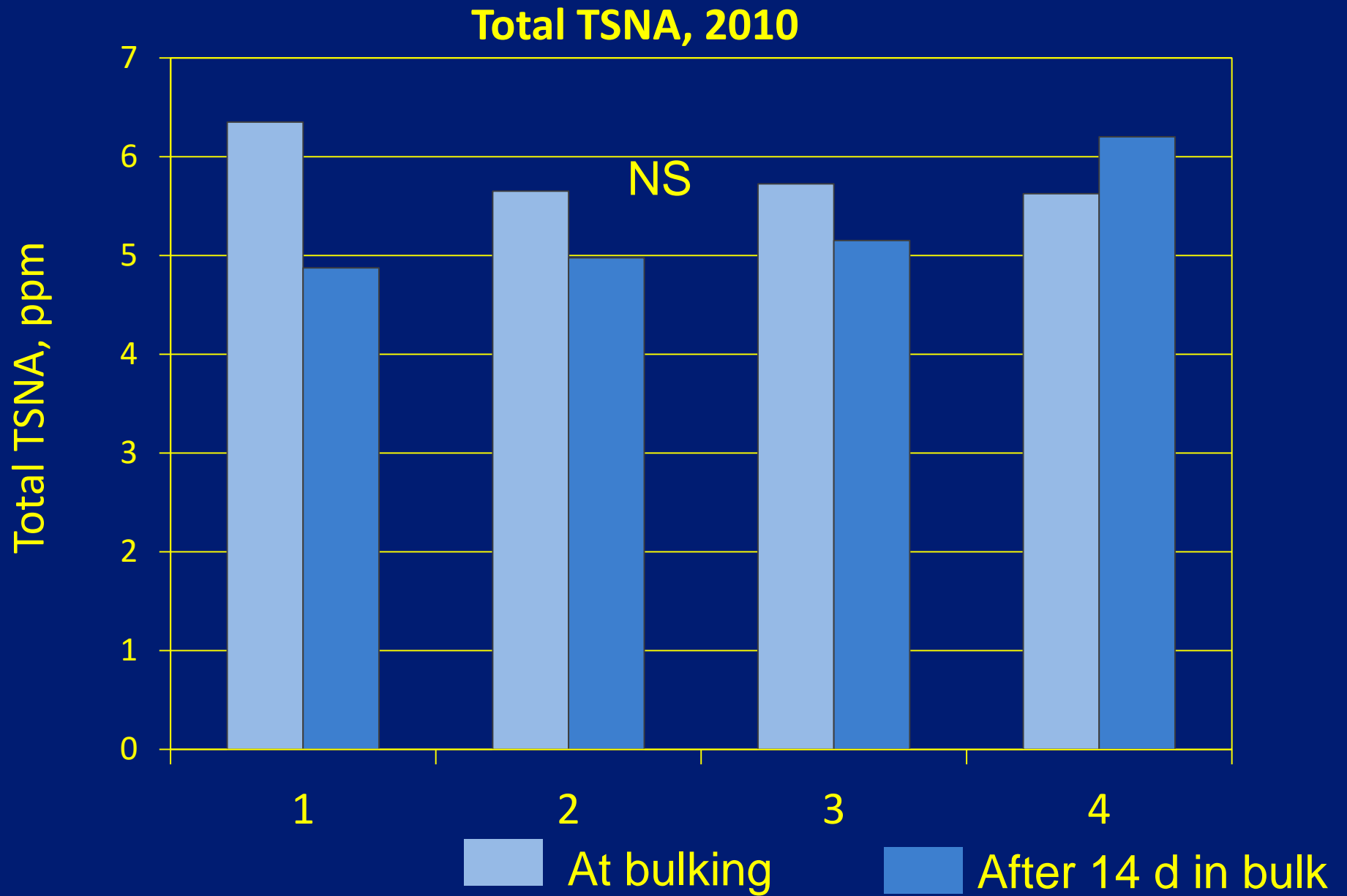


Moisture Content after 14 d, 2012

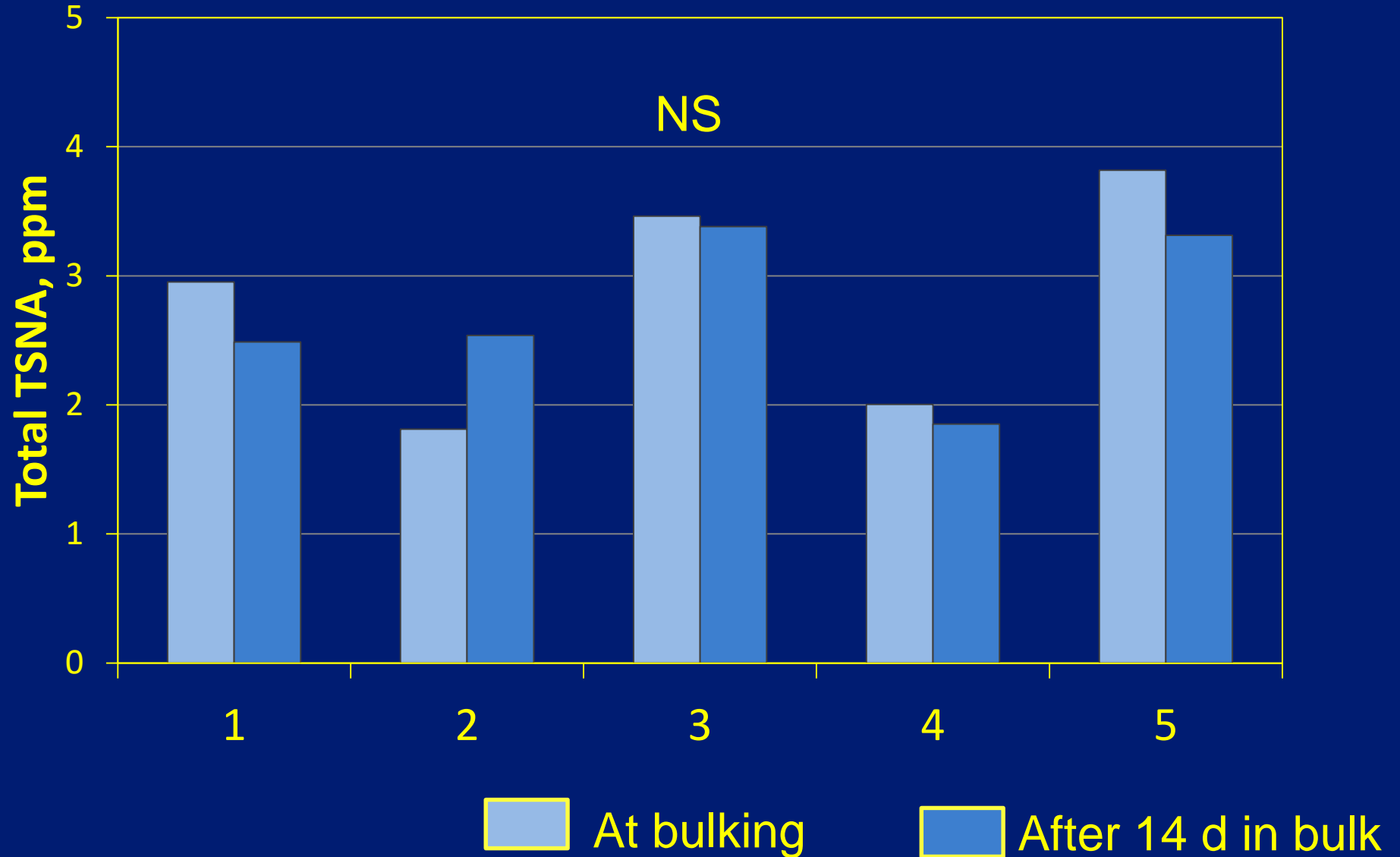


Moisture Content after 14 d, 3 years

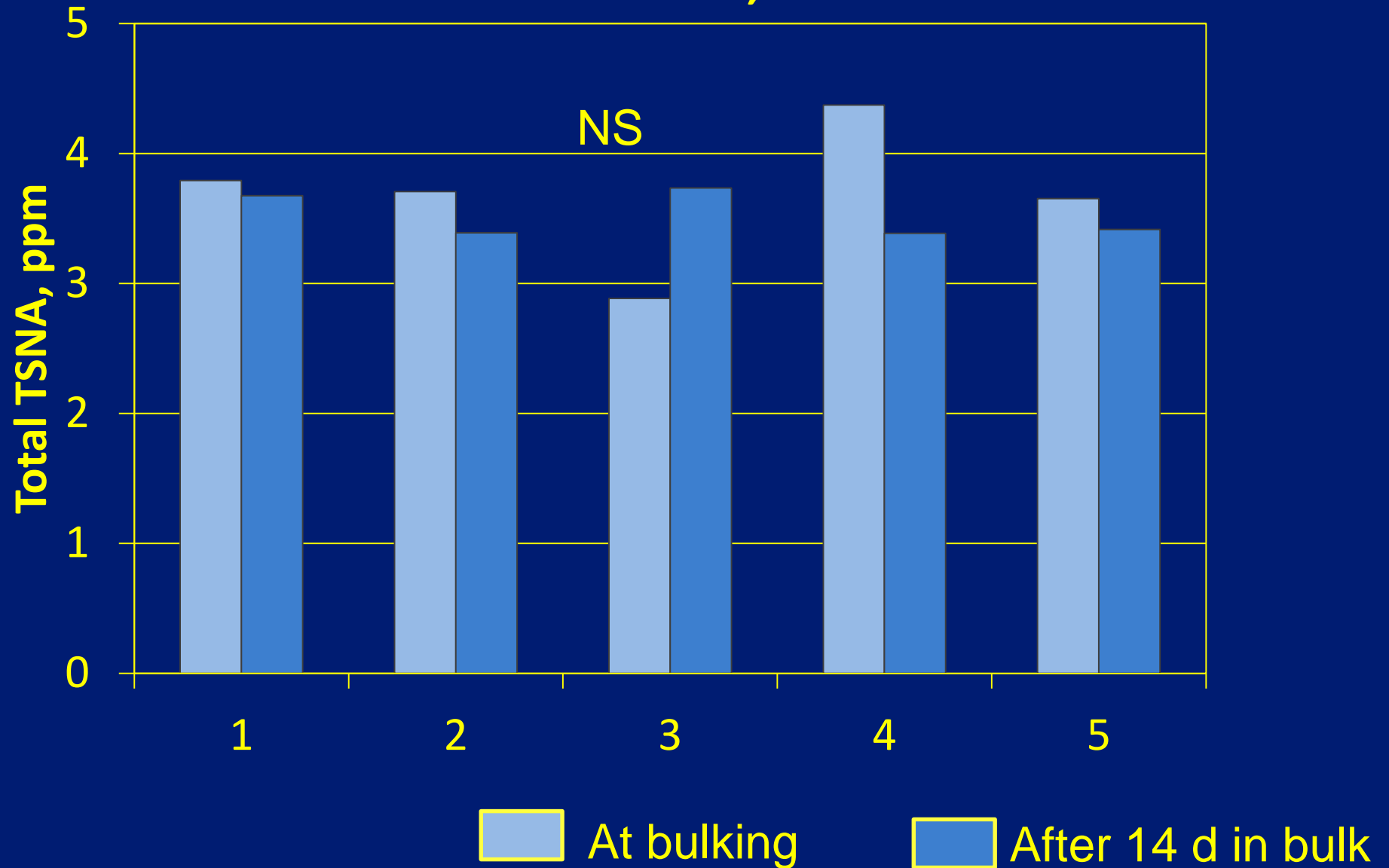




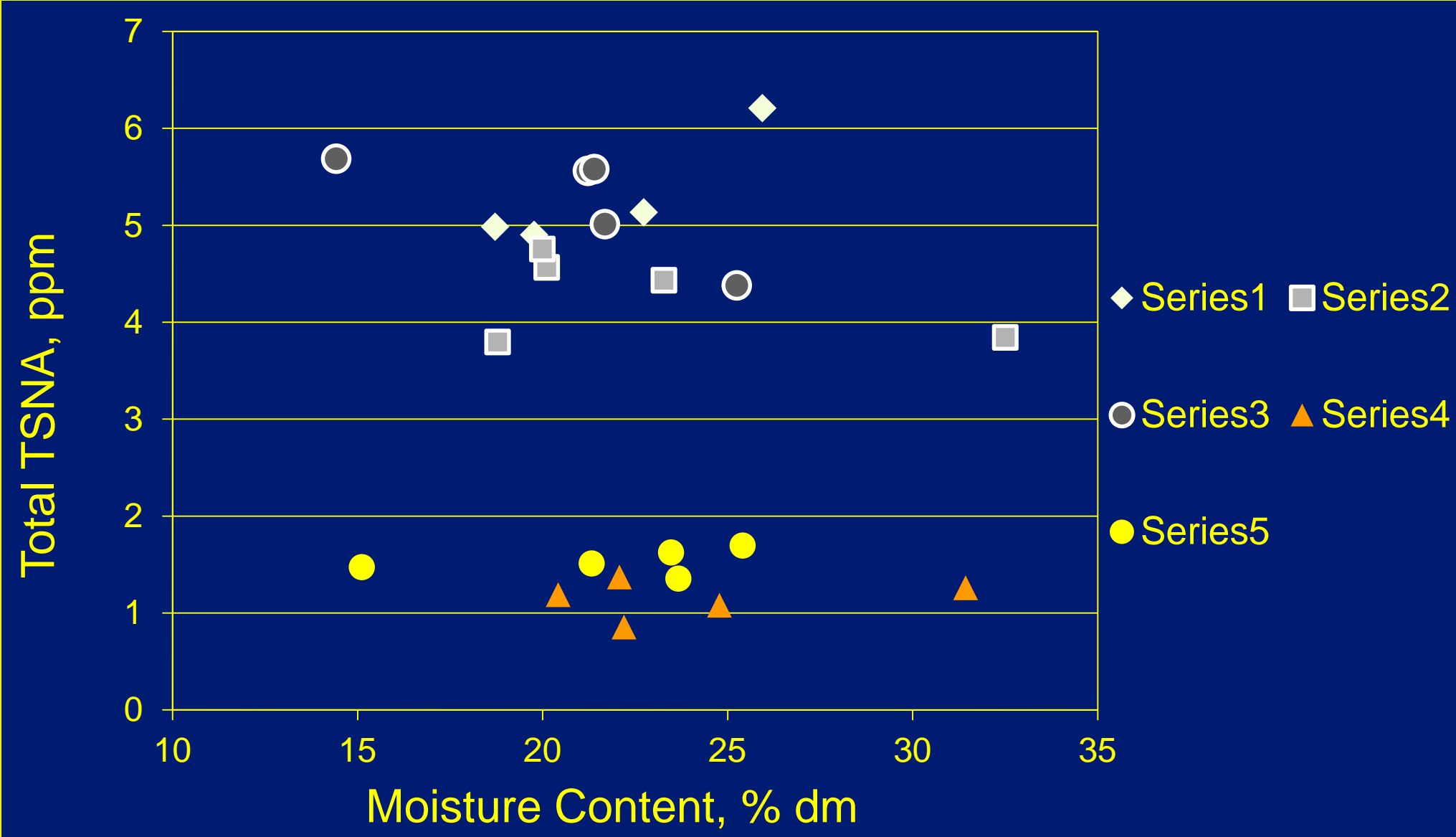
Total TSNA, 2011



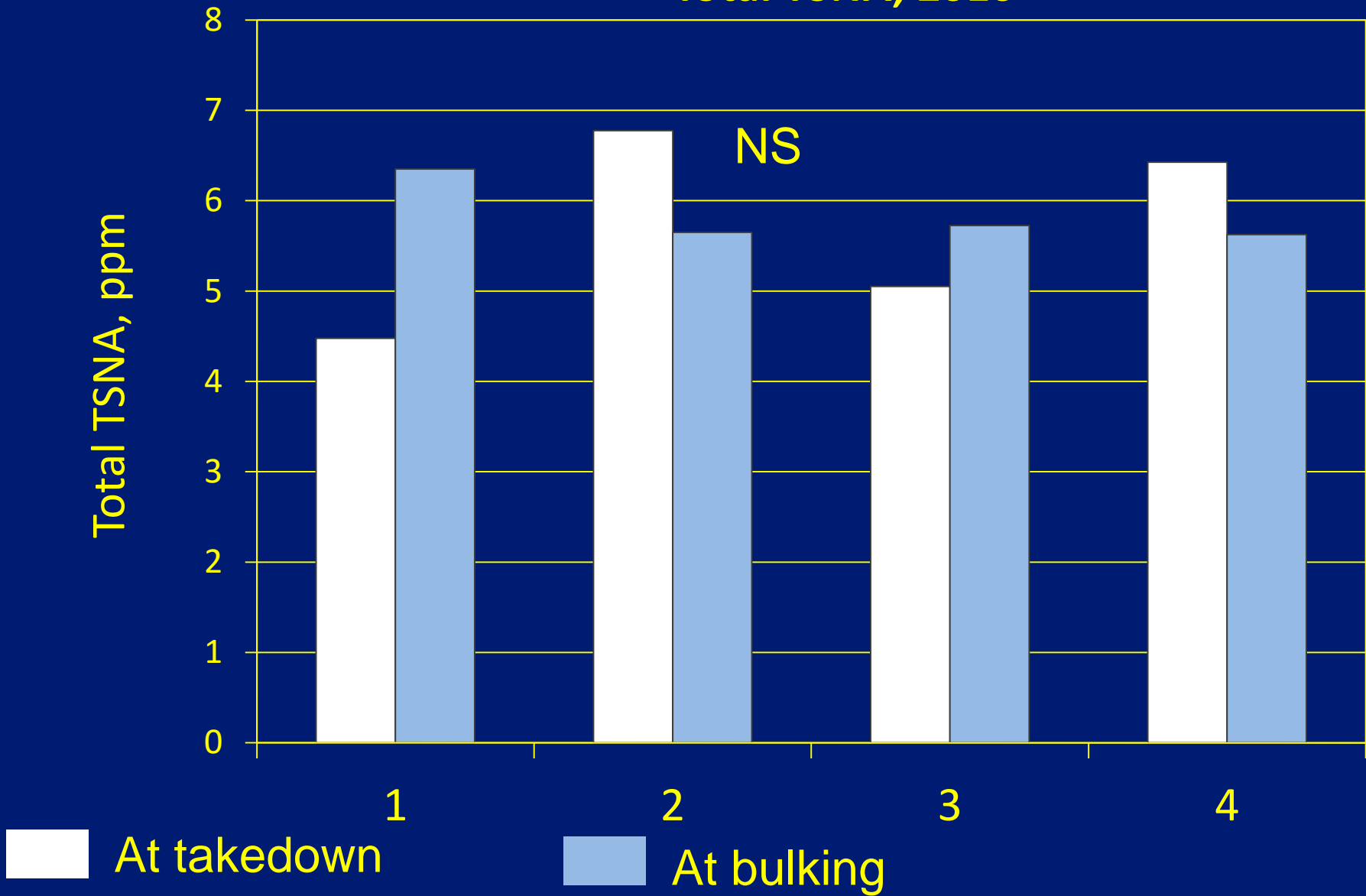
Total TSNA, 2012



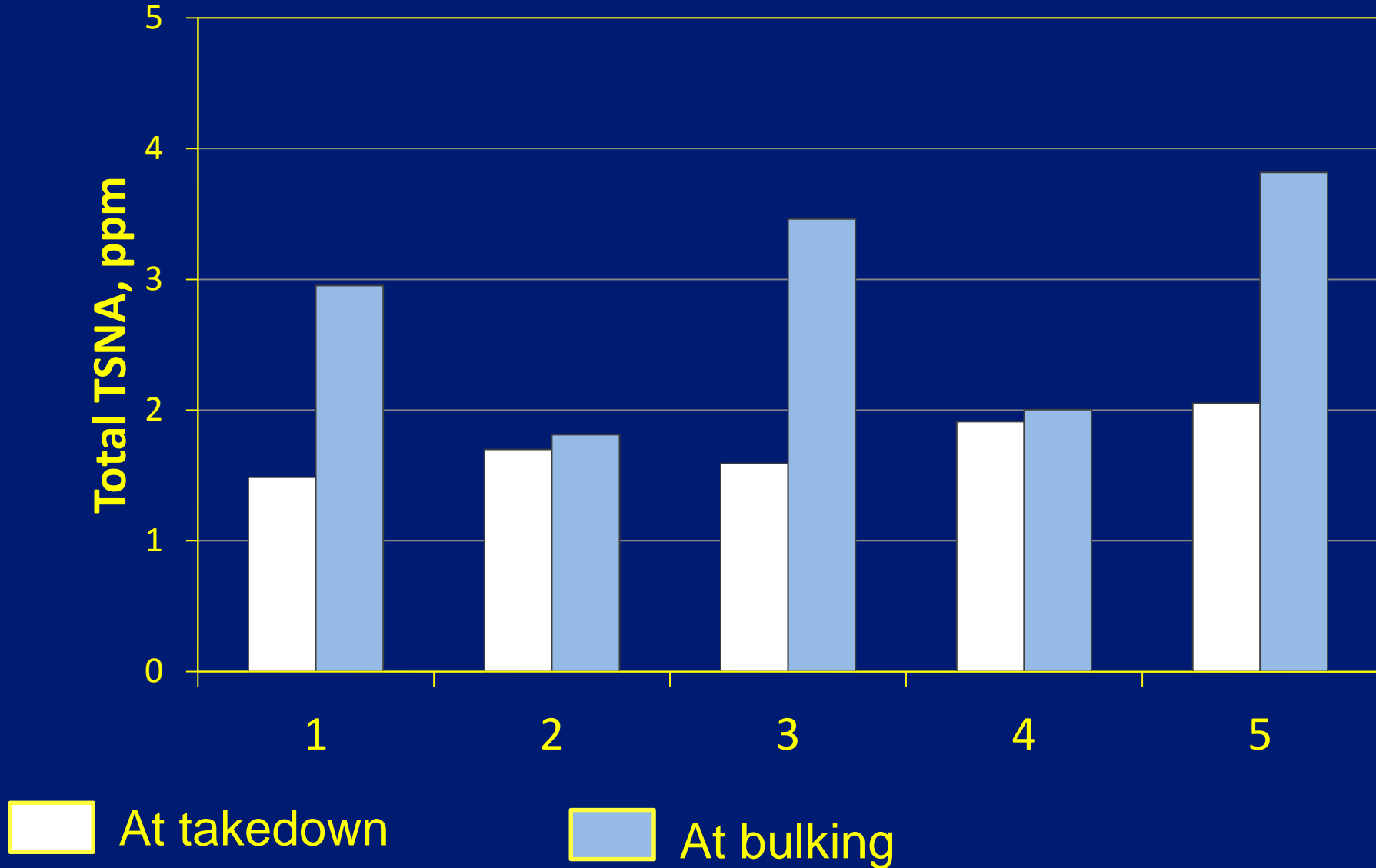
Effect of moisture content during 14-day storage on TSNA Total TSNA



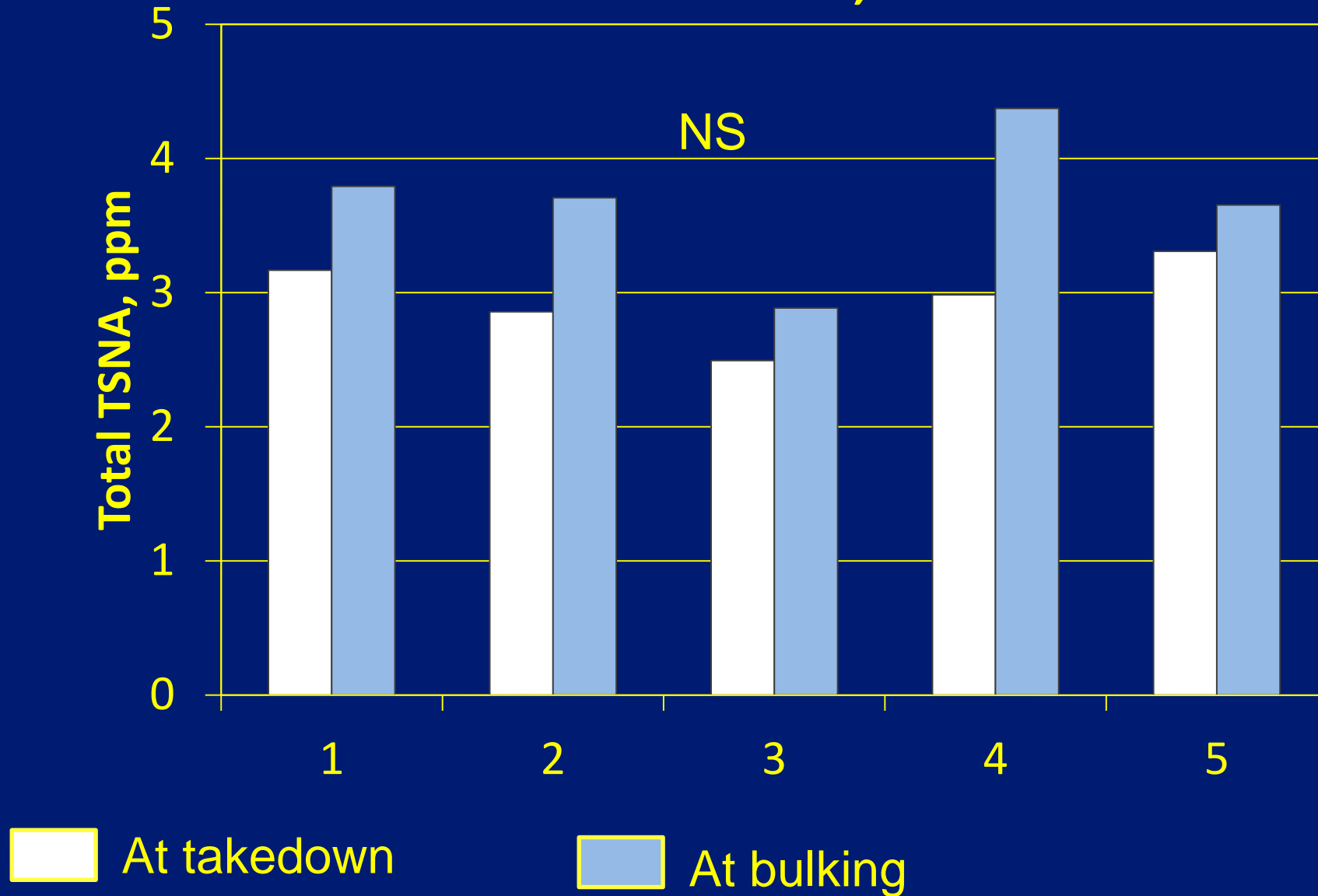
Total TSNA, 2010



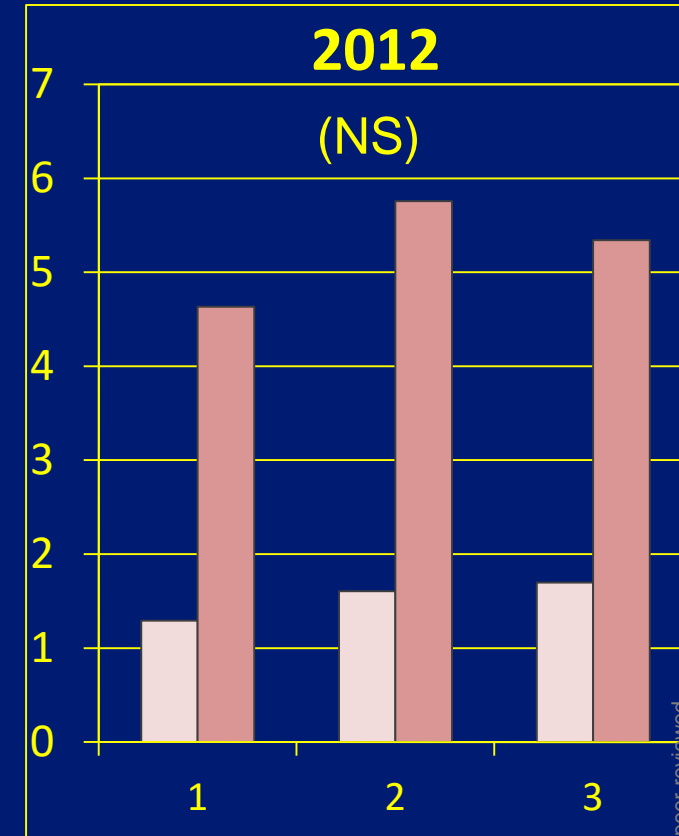
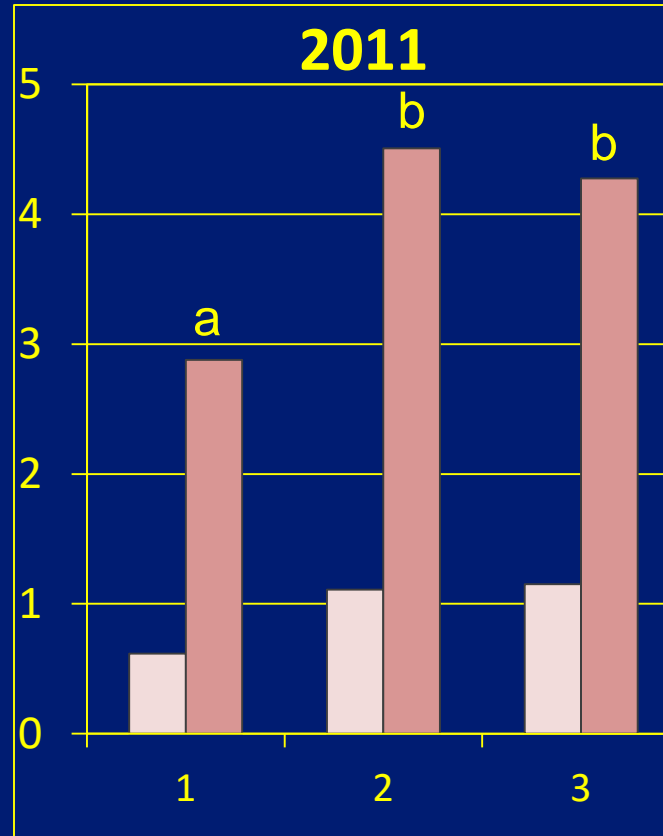
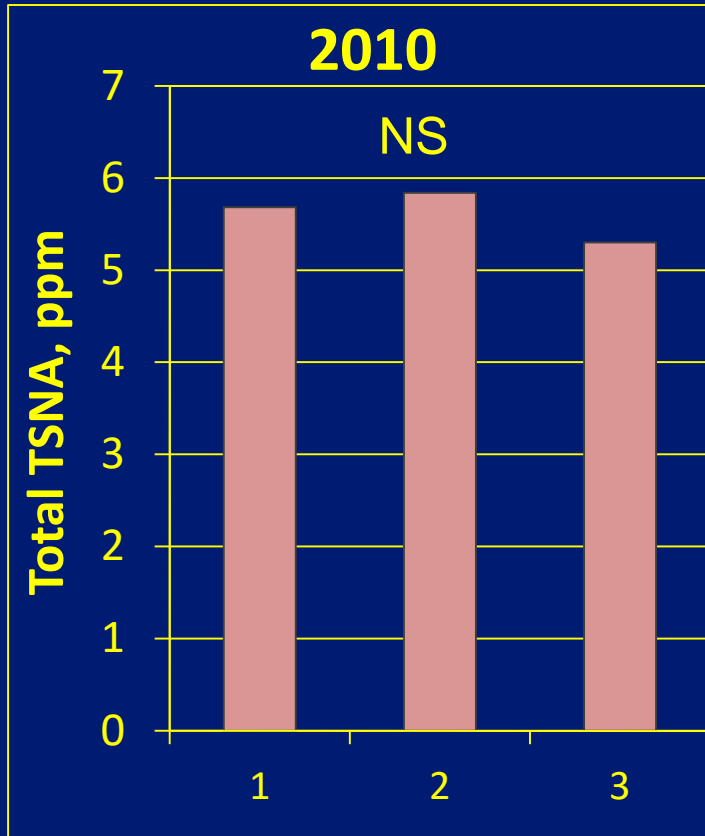
Total TSNA, 2011



Total TSNA, 2012



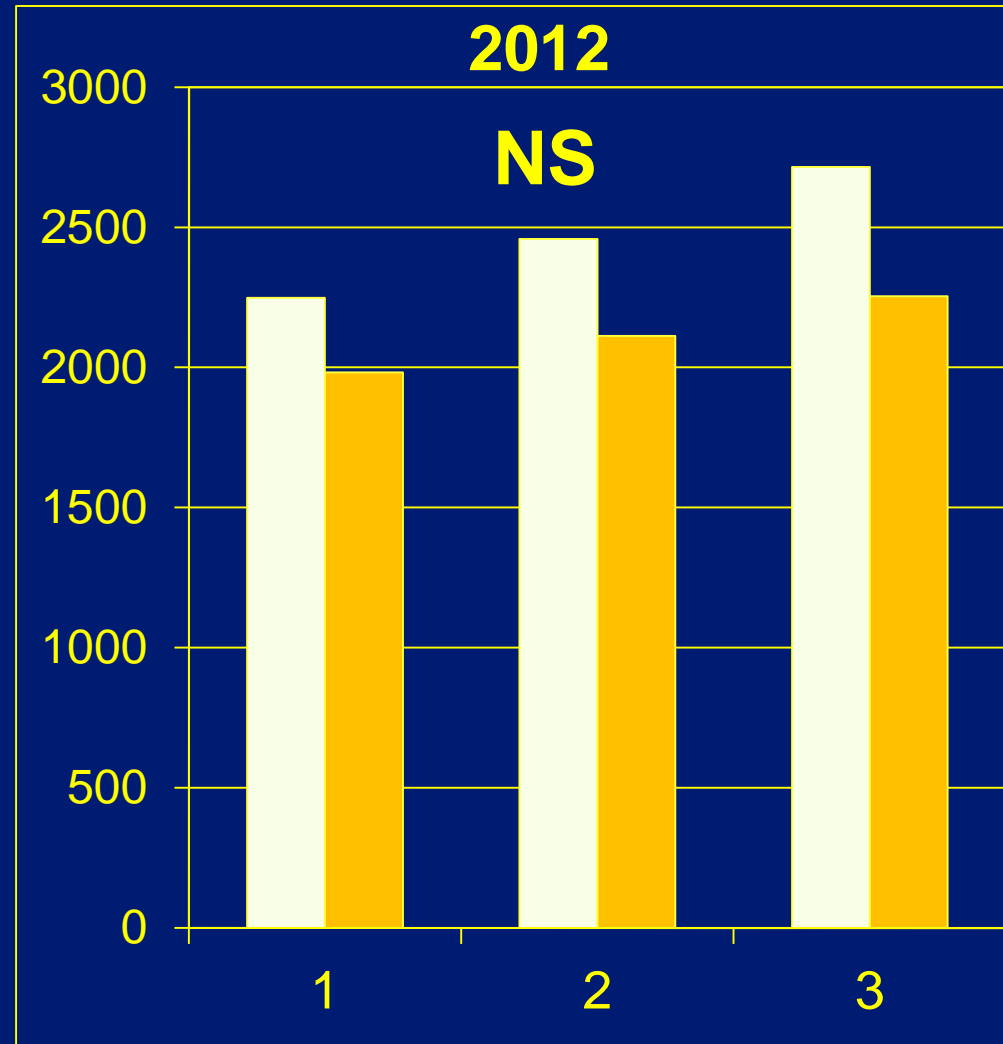
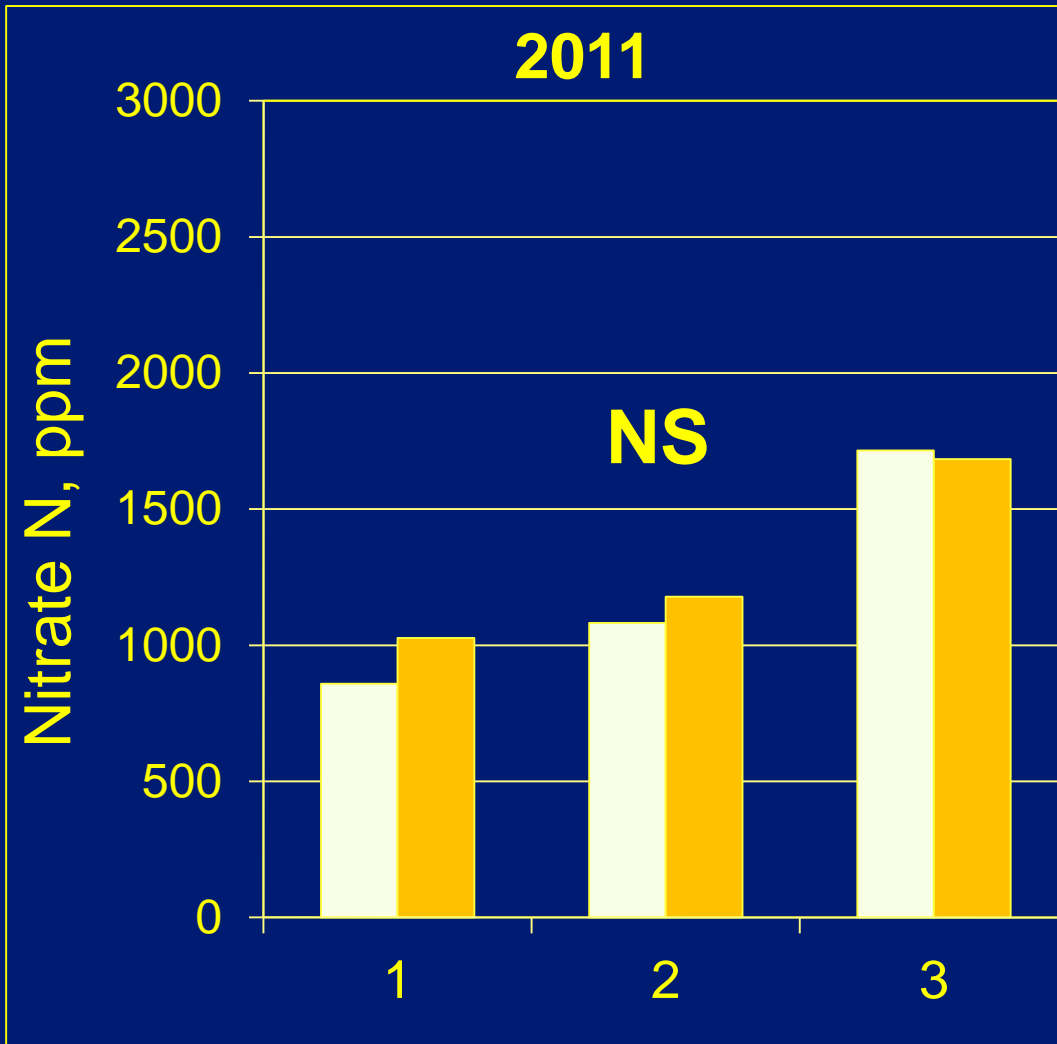
Total TSNA, all ordering treatments



 TN 90H

 TN 90LC

Nitrate Nitrogen

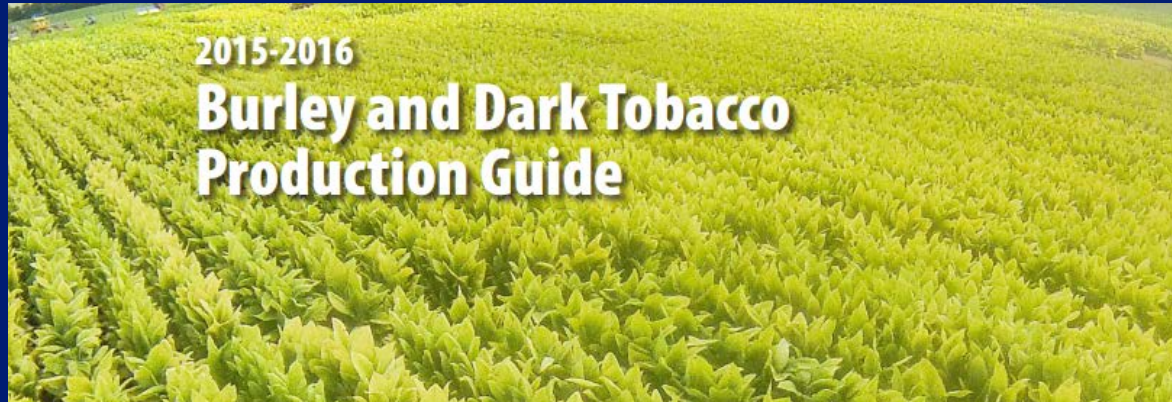


■ TN 90LC

■ TN 90H

Conclusions

1. Method of ordering has no apparent effect on TSNA during 14 days in bulk
 - Dec-Jan temperatures in Kentucky near freezing
2. Moisture content dictated by method of ordering
 - Increasing difficulty of controlling amount applied as droplet size increases
 - Natural < steam < mist < spray < thumb & hose
 - moisture could very easily exceed contracted limit
 - water damage reduces quality?
3. ? Increase from takedown to bulking (<24 hour)
4. ? Increase in nitrate N



- Allow burley tobacco to come into case naturally



- Do not leave tobacco in storage longer than necessary; strip, bale, and deliver tobacco as soon as possible.





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