# Nitrogen Management for Texas High Plains Wheat – Is Your Top Dress N Late?

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Texas A&M AgriLife Extension

Texas Panhandle & South Plains

# Objectives

## An improved understanding of…

- Wheat N requirements—How much N to apply?
  - And to what extent might we credit deep soil N?
- Wheat N topdress timing—When?
- There is one key stage of growth in wheat that defines our understanding of the timing of topdress N—What is it?

# A&M AgriLife "Pick" Wheat Grain Varieties—Texas High Plains

(2013-2014)

| Full Irrigation | Limited Irrigation | Dryland |
|---|---|---|
| TAM 111 | TAM 111 | TAM 111 |
| | TAM 112 | TAM 112 |
| TAM 113 | TAM 113 | TAM 113 |
| TAM 304 | | |
| Duster | Duster | Duster |
| Hatcher | Hatcher | Hatcher |
| Winterhawk | Winterhawk | Winterhawk |
| | | Endurance |

For further information consult the annual edition of "20XX Wheat Variety Trials Conducted in the Texas and New Mexico High Plains," (Trostle, Rudd, others).

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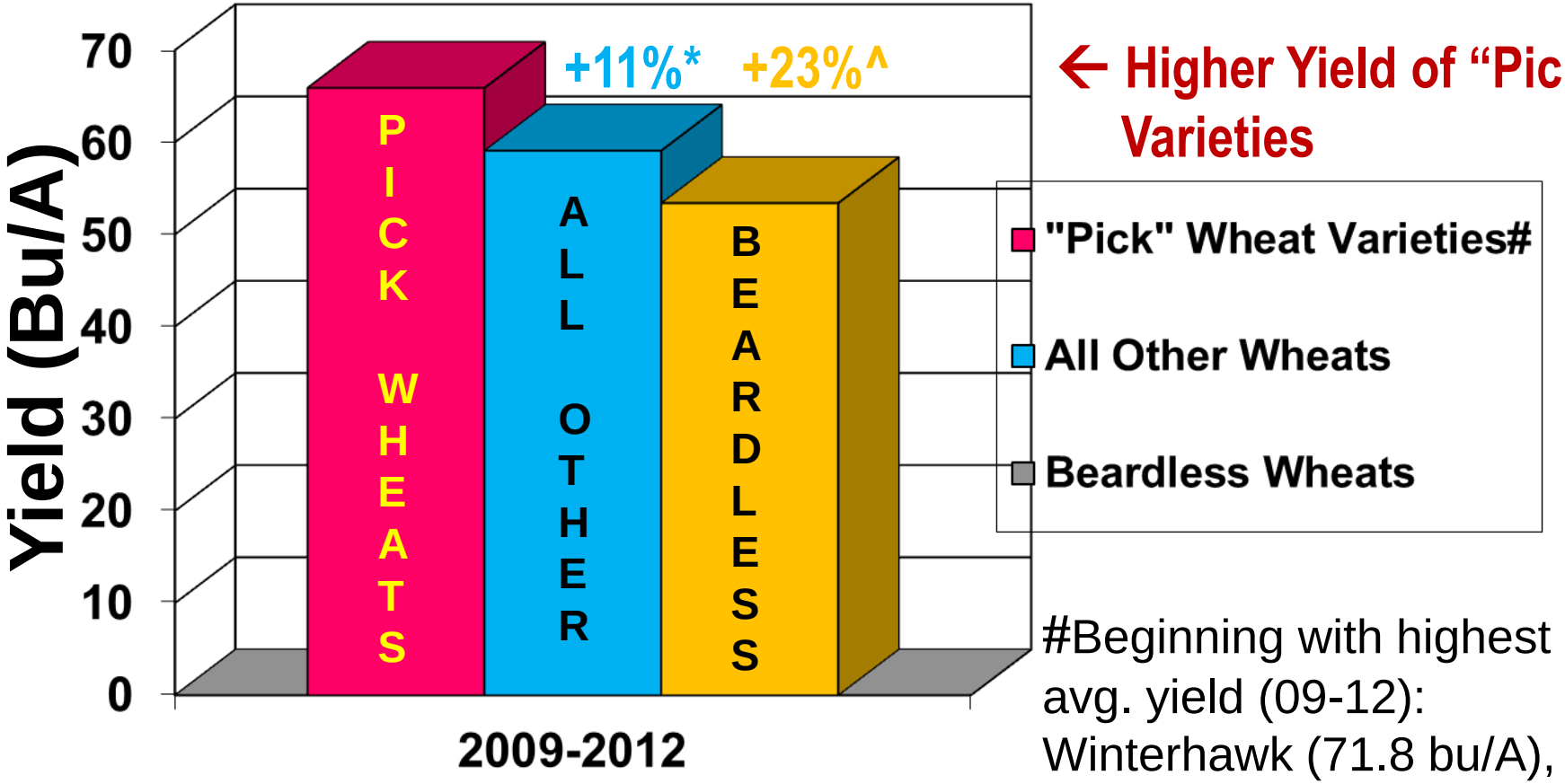
# Irrigated Wheat Grain Yield

## (22 TX High Plains sites across 4 years)




**PICK varieties vs. all Other varieties.*
*^PICK varieties vs. all Beardless varieties*

#Beginning with highest avg. yield (09-12): Winterhawk (71.8 bu/A), TAM 111, Hatcher, Duster, TAM 112, TAM 113, TAM 304

# Wheat Grain Yield Components

- Number of tillers/number of heads
  - determined earlier in season (early season N has an effect)
- Potential number of seed
  - determined by time sheaths stand erect (number of spikelets/seeds per spike)
- Actual number of seed (flowering)
- Seed size (grain fill)

# Top Dressing N for Wheat

- In conversations with many producers, fertilizer dealers, and crop consultants Extension has become concerned that many producers are applying topdress N on wheat late:
  - More likely late the further south in the Texas High Plains
  - Lower South Plains—applications as late as April 1 (March 1 is an approximate date for jointing)
  - Ranging to early April applications in the northern Texas Panhandle (less concern, typical jointing March 15-25)
- Why is this timing too late, and what are the implications?
  - Many producers do put top dress N out too late—in the Texas High Plains we should think “late winter” topdressing, not spring topdressing

# Wheat N Requirements

- For grain
- There is a basic rule of thumb
- Have you heard of it?

# Simple Nitrogen Rules of Thumb—Wheat for Grain

- If no soil test info.: 1.2 lbs. (units) of N per bushel of yield goal
  - 50 bu/A yield goal X 1.2 = 60 lbs. N/A
- With soil test info.: 1.5 lbs. (units) of N per bushel of yield goal, then deduct soil test N contribution
- This N is NOT fertilizer N alone, but N any source including:
  - Soil available N
  - Fertilizer N
  - Mineralization of N from manure and compost applied within the past 2 years
  - Even N in irrigation water (more likely significant for lower South Plains, portions of northern and especially northwest Rolling Plains)

# Simple Nitrogen Rules of Thumb—Wheat for Grain

- Soil test recommendations in Kansas, elsewhere might view these ‘Rules of Thumb’ as overly simplistic, but our goal is to get producers as ‘in the ballpark’
- For example Kansas State or Oklahoma State soil test may adjust for previous crop, soil type (texture), soil organic matter—in general these considerations may help refine N recommendations but the differences versus our ‘Rules' are usually minor

- "Some combination of fall pre-plant or at-seeding nitrogen, and/or early top-dressed nitrogen, is also normally needed to supply adequate nitrogen to support head (growing point) differentiation. This is the stage when head size is being determined, and can begin about 2 weeks before jointing."

# What to do with subsoil nitrate-N?

- Question: "I have 30 lbs. of nitrate-N at 6-18" deep in my soil. Should I fully credit that N to my wheat crop requirement?

# What to do with subsoil nitrate-N?

- Question: "I have 30 lbs. of nitrate-N at 6-18" deep in my soil. Should I fully credit that N to my wheat crop requirement?
- ***YES***. *Texas A&M AgriLife data across many soil types and different crops across the state shows that for all practical purposes we **CAN** credit that N to crop requirement.*
  - *When soil fertilizer tests have been conducted and the soil profile N below 6" is deducted from the applied N there is essentially no difference in yield due to the N fertilizer reduction.*

# Wheat N Topdress Timing

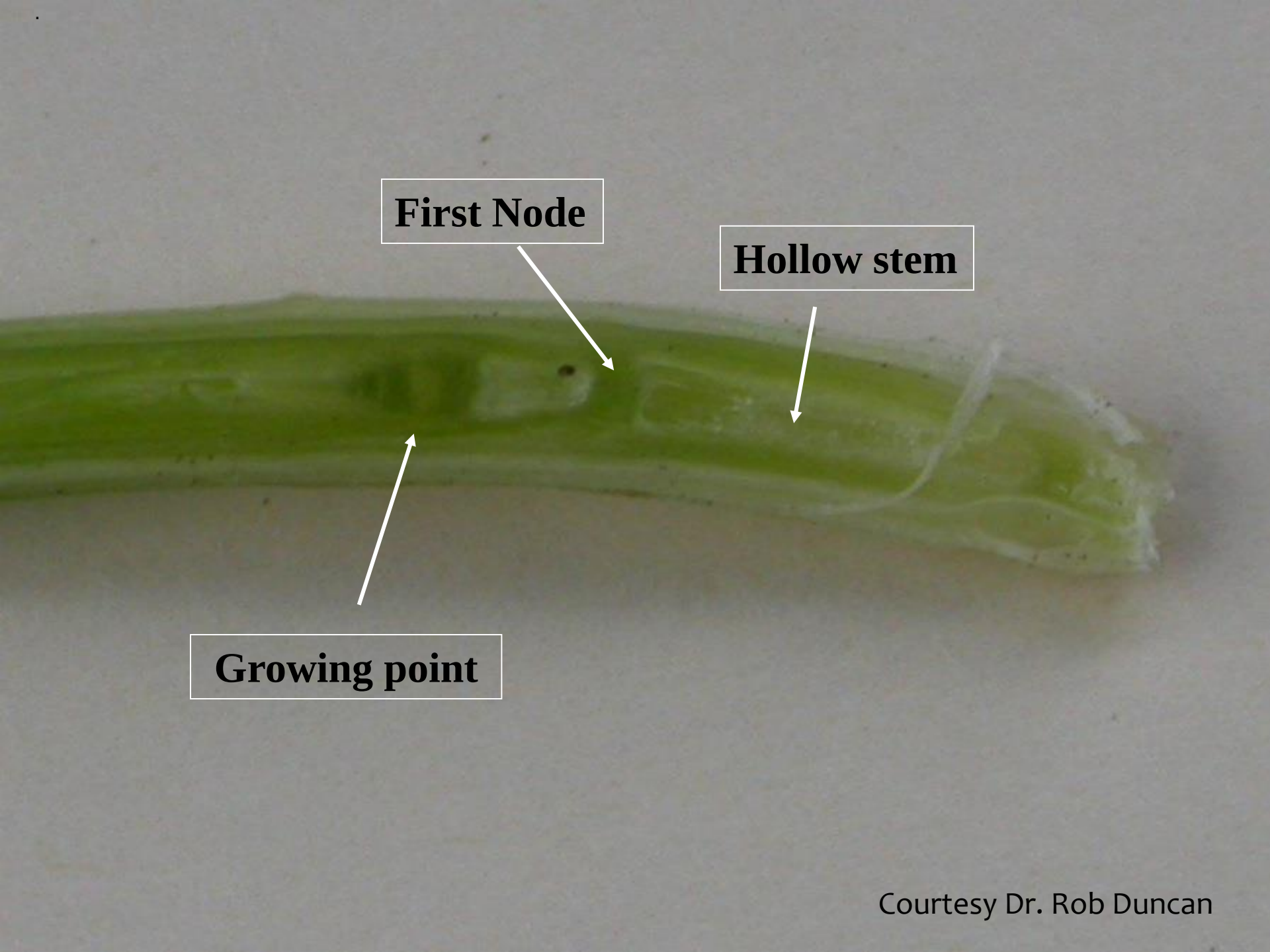
- For grain
- There is a basic rule of thumb
- Have you heard of it?
- Is it the correct rule of thumb?

# Nitrogen Timing I

- Leaf sheaths strongly erect—jointing has occurred
  - Rub the stem between your forefinger and thumb—when you feel a node (like a little bee-bee in the stem), that wheat stem has already jointed.
  - The growing point is on top of the uppermost node you feel in the stem
- Ideal stage of growth for topdress N is just prior to jointing *(Why?)*

# Nitrogen Timing II

- Ideal stage of growth for topdress N is just prior to jointing *(Why?)*
  - Look for earliest joints to signal topdress N timing—when you see the first few joint across the field, the rest of the field has likely began the jointing process, e.g., the growing points are now starting to differente or about to begin
- Later applications (jointed or later) do not affect potential number of seed per head.




Courtesy Dr. Rob Duncan

# More from Kansas State…

- "How late can nitrogen be applied on wheat and still pay, particularly with the price of nitrogen so high?"
- "Research from Kansas State and other universities has shown that nitrogen-deficient wheat will almost always respond to additional nitrogen fertilizer by increasing yield and protein content—as long as the nitrogen is applied before flag leaf emergence…
  - …but know that yield response is **reduced**."
- "But once the wheat heads, producers are unlikely to receive an economic yield benefit from applying nitrogen, even if the wheat is nitrogen deficient."

Growing point differentiation in wheat: a small head down in the stem. Spikelet number and seeds per spikelet already determined for this stem. If grazing and then going to grain cattle should have been off at least 7-10 days ago.

## *Other Considerations*
# Nitrogen Timing III

- For late planted wheat/wheat that emerges late
  - Wheat may be subject to minimal tillering or even no tillering at all for very late wheat
  - Nitrogen (and irrigation, if available) can help accelerate the much-needed tillering process
  - If you have no tillering initiated, likely by mid-February, then some N should be applied sooner than regular jointing to get tillering started, even more so if you have not yet applied any N at planting
- For wheat that is thin or looks pale or even yellowish…
  - Advance your topdress N to apply sooner to potentially drive tillering to thicken up the stand or alleviate a possible N deficiency

# N Timing on Wheat for Grain

- Minimal N fertility? Consider ~1/3 of N in fall, topdress 2/3 in late winter/early spring before jointing
- If residual fertility is good, then minimal or no Fall N unless stand is thin (though you might advance spring applications some)
- Go earlier with later winter/spring topdress N if:
  - Rain is predicted (to incorporate N)
  - Earlier maturity (TAM 112, Armour, Greer, Jackpot, Fuller, TAM 401; old lines Jagger, TAM 110)

# N Timing on Wheat Grain

- For dryland wheat:

- You might consider applying all N in fall & incorporate which may be best;
- If residual fertility is good, then delay N until late winter/early spring and adjust target N up/down based on field conditions.

# Nitrogen Timing

- For best topdressing results, N has to be in the root zone—"In the System"—before jointing occurs
- N laying on the surface that hasn't been rained or snowed on or washed in by irrigation is not yet available to the plant
  - For this reason, especially for topdress N applications with dry fertilizer N, allow time for potential rain/snow or irrigation to wash the N into the root zone

# Summary Statement: #1

- "If you are debating whether to topdress your N…"

*How would you finish this statement?*

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# Summary Statement: #1

- "If you are debating whether to topdress your N… go ahead and do it."

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# Summary Statement: #2

- In Kansas… farmers, research, extension talk about **Spring** topdressing for wheat

- But in the Texas High Plains we should think of it as **Late-Winter** topdressing (a little sooner)

# Summary Statement: #3

- It is early February in the Texas South Plains, or mid-February in the Texas Panhandle, and you have dryland wheat that could benefit from topdressing….

- "The weather forecast in 2-3 days calls for 50% chance of rain changing over to 70% chance of snow overnight, and more snow chances the next afternoon…"

- Should you consider topdressing now?

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# Summary Statement: #3

- Should you consider topdressing now?

- **YES!** You need moisture to incorporate the N. Moisture chances looks promising (this is Dryland). This is a good bet. It may be up to 4 weeks earlier than you typically topdress, but you might not get another rain or snow for over a month (thus your later topdress N is late and isn't as effective).

# Summary Statement: #4

*Compare these 2 comments…*

- "When you see the first few joints across a field, it is time to topdress your N."

**Vs.**

- "When you see the first few joints across a field, if you haven't already topdressed your N get it done as soon as you can."

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# Summary Statement: #4

*Compare these 2 comments…*

- "When you see the first few joints across a field, it is time to topdress your N."
- "When you see the first few joints across a field, if you haven't already topdressed your N get it done as soon as you can."
- *When you see the first few joints many of the rest of the plants have started growing point differentiation, so you may* ***already be a little late****…*

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