Malt Barley Management

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Discussion topics

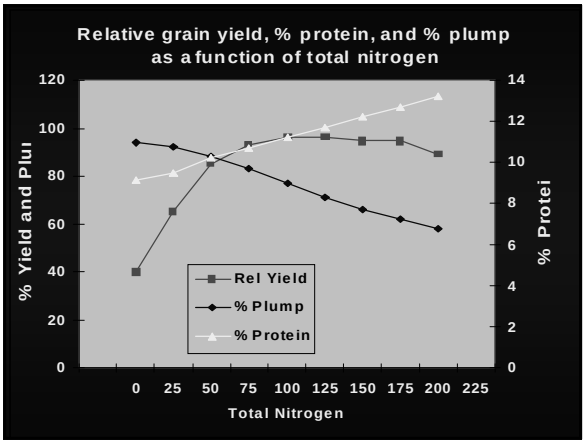
- Planting date
- Growth stages, growth rates
- Seed quality
- Seeding issues
- Soil testing, fertilizer rates

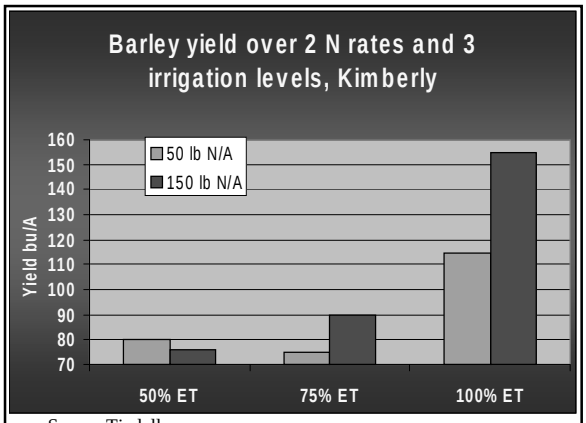
Understand the difference between guessing input needs and managing input needs

Understand which inputs have critical levels and their impact on yield and quality

Soil tests, nutrient management

- Take soil test – don't guess
- Use realistic yield targets
- Amount and timing affects yield and quality
- Split application of N generally results in an increase in grain protei
- 4R's- Right amount, Right timing, Right place, Right kind





Source Tindall

Factors to consider when calculating N needs

- Residual inorganic N – from soil test
  - PPM x 4 = lb/A
- Previous crop residue levels
- Realistic yield goals
- Use of the crop
- Desired protein level

Fertilizing spring barley

- P and K not needed as much as N
- Micronutrients generally do not give positive response in Idaho
- Banded applications generally more effective than broadcast and can reduce rates with P

Factors affecting protein

- Genetics - Variety
- Seeding rate
- Seeding date
- Fertility rate and timing
- Irrigation amount and timing
- Environment

Malt barley guidelines

- Protein preference is between 11-12%
- General guideline – 1-1.3 lb N/bushel
- High protein
  - Reduces extract
  - Gives erratic germination
  - Generally has lower plump
- Make grain quality the primary concern

Nutrient management

Calculation

< Total N needed = rate/bu *expected yield

< Subtract inorganic N (from soil test)

< Add or subtract for previous crop residue

< Subtract 45 for mineralizatio during season

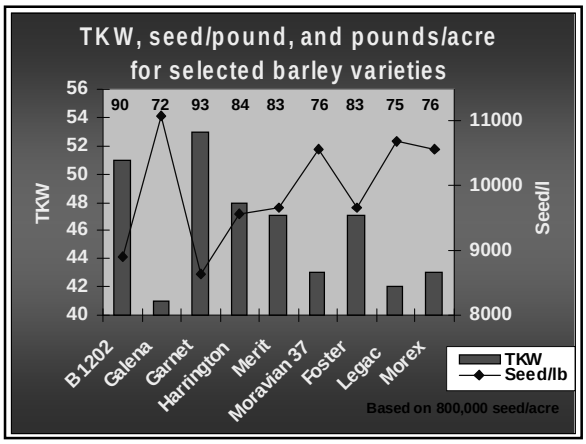
Know the base the recommendations are based on - 12 or 24 inch sampling depth

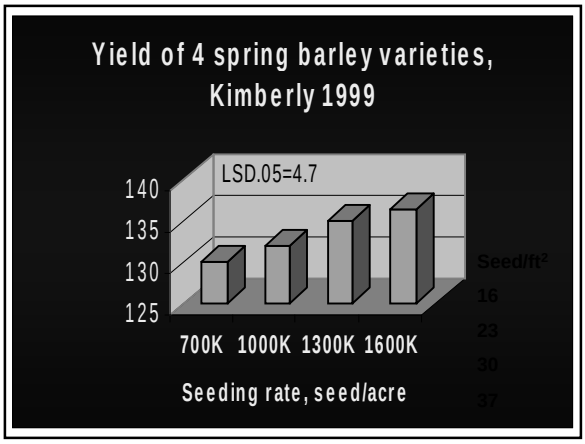
Calculating N needs

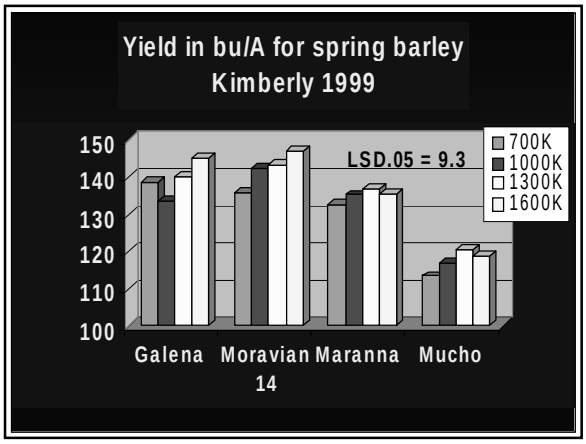
	Row crop	Cereal	Alfalfa
Yield goal 120 *1.2	144	144	144
Soil test -15ppm	-60	-60	-60
Previous crop	0	50	-50
Mineralization	-45	-45	-45
Total to apply	39	89	(11)

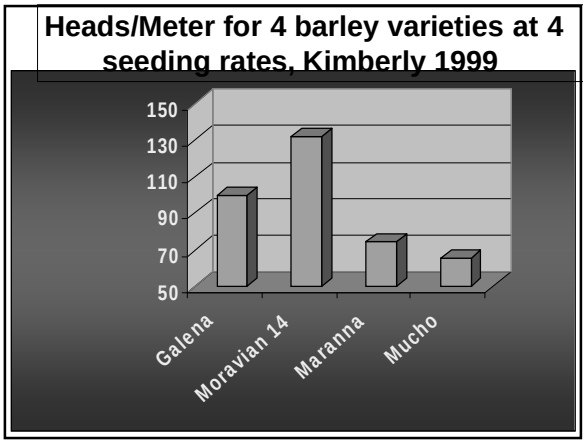
Seeding rate considerations

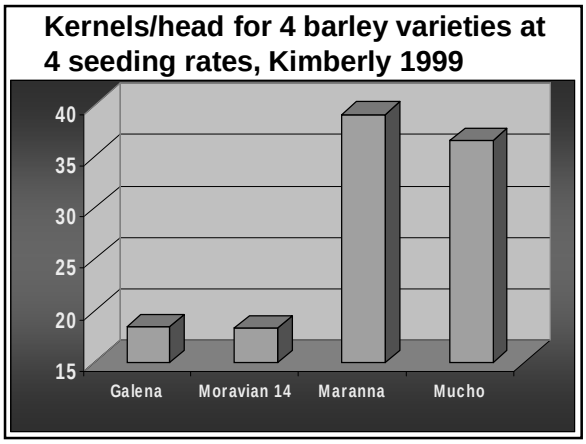
- Know seed size of variety to be planted
  - Seed/lb = (1000/seed wt in gm) * 454
- Know germination percentage
- Know purity
- Know how your variety responds
- Check and calibrate drill
- Use good emergence estimate
- Target population = 750,000 – 850,000

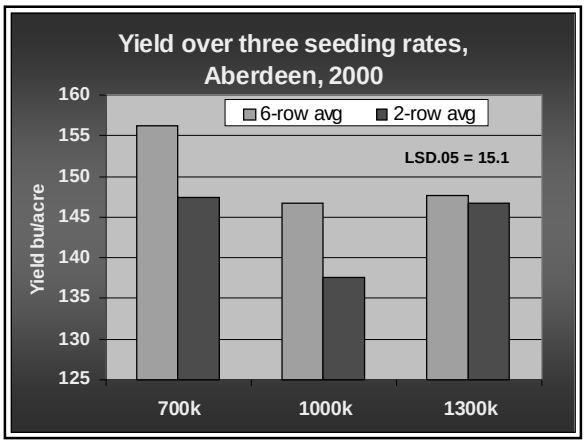


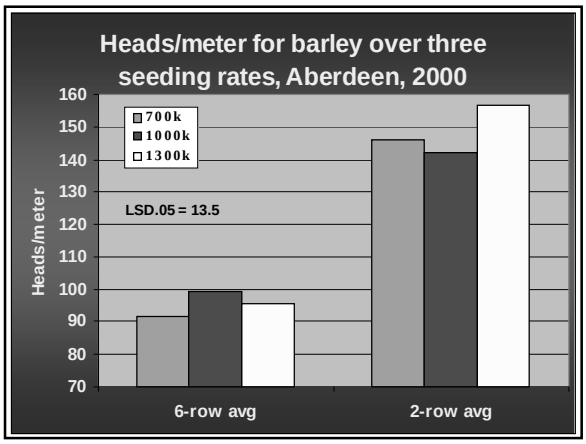


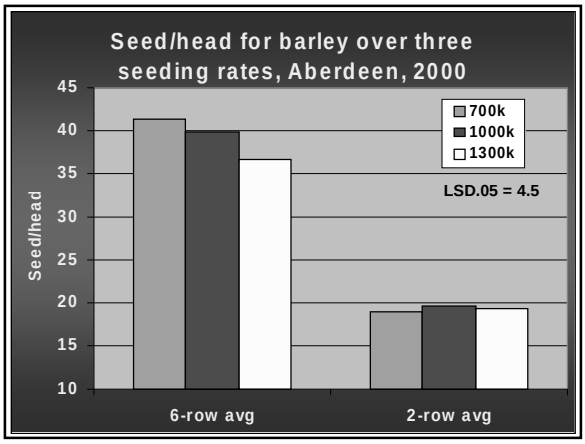












Why the difference?

- 1999 was very dry spring – Kimberly did not get irrigation water until tillering was mostly completed
- Two-rowed varieties depend more on tiller development for yield
- Preserving kernels/head is more important for six-rowed varieties

Seed Quality

- Test for germination: laboratory preferred but can do at home
- Do not use seed that has been stressed during production
  - moisture, temperature, disease
- Make sure test weigh is high
- Visually inspect seed to insure good development
- Certified seed reduces risk

Seed Quality Correlation, 1990-91

- Combined data for 3 SW, 4 SB, and 3 WW, 19 total seed sources

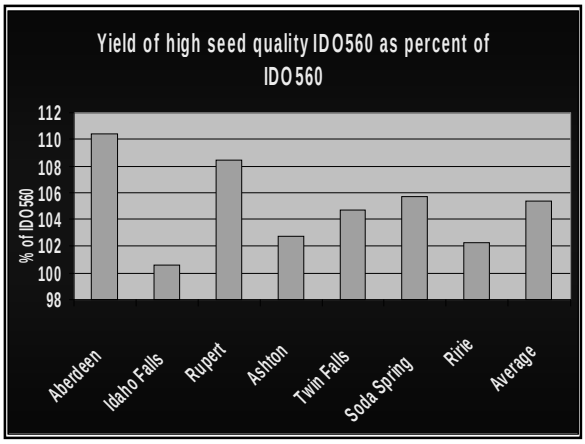
Seed Source	Yield
Protein %	-.04 ns
Protein mg/seed	0.41**
TKW	0.45**
Test Wt	0.34*

Effect of seed quality on yield of spring barley varieties, 1999

- Aberdeen-irrigated-12 varieties
  - Good seed = 146.4 bu/A
  - Poor seed = 138.9 bu/A LSD.10=2.7
- Idaho Falls-dryland-6 varieties
  - Good seed = 24.8 bu/A
  - Poor seed = 22.7 bu/A LSD.10=1.6

Test weight, thousand grain weight, and kernel diameter for IDO560 and high seed quality IDO560

	IDO560	HI Q IDO560
TW	62.8	63.3
TKW	43.0	45.8
Diameter	2.65	2.78



Planting date

- Yield potential is set in first 30 days after emergence
- Advantage from earlier planting
  - more tillers
  - more kernels/head
- Lower temperature during seed fill
  - larger, plumper kernels

Spring barley yield over seeding dates, 1989-90

Seeding date	Yield lb/A
Mid-Apr	5446
Early May	4597
Mid-May	3477
Early June	3233

LSD.05 = 430

4 Varieties, 2 years

Seed quality, seeding management

- Use high test weight, high plump seed
- Do not seed deeper than necessary
- Seed at the proper population
- Evaluate need for seed treatment before paying for it
- Seed as early as soil conditions permit in spring

Plant population per acre

Row spacing	Seedling count from 24 inches of row			
	14	16	18	20
4				
5				
6				
7				
8				
9				
10				

Growing Degree Days (GDD)

- Thermal time used to describe cereal development is measured as growing degree days
- GDD(^{0}F) = $\frac{TMax + TMin}{2} - 32$
- GDD(^{0}C) = $\frac{TMax + TMin}{2}$
- Min is 32 ^{0}F and Max is 95 ^{0}F

Example –

TMax = 80 and TMIN = 42

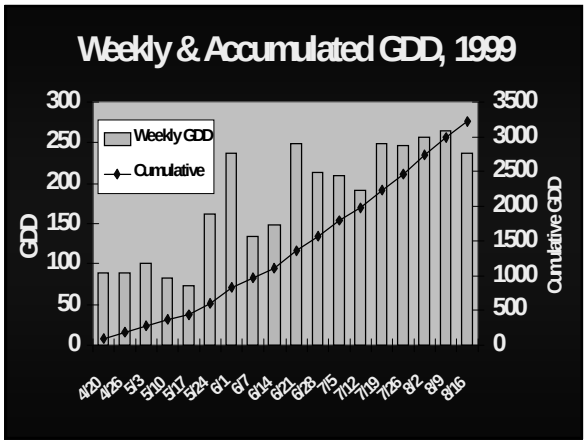
80 + 42 = 122

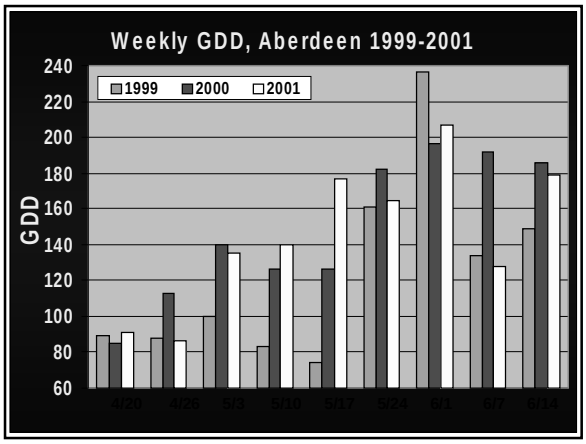
122 / 2 = 61

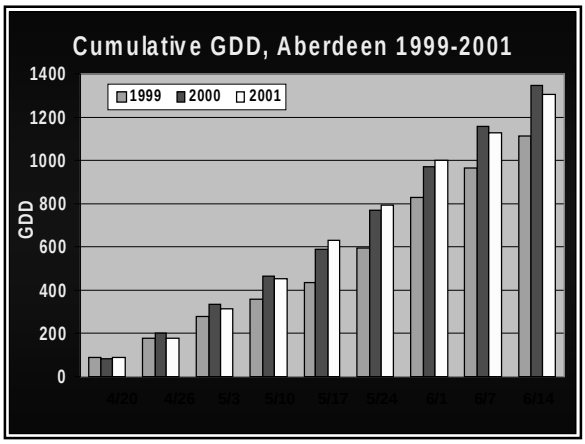
61 – 32 = 29 GDD

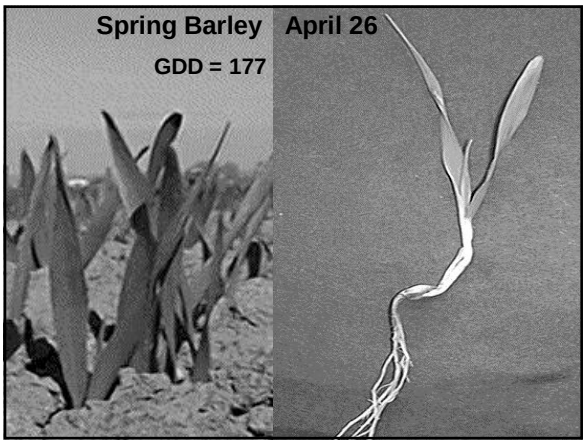
Approximate GDD required for cereals to expand one leaf, = phyllochron

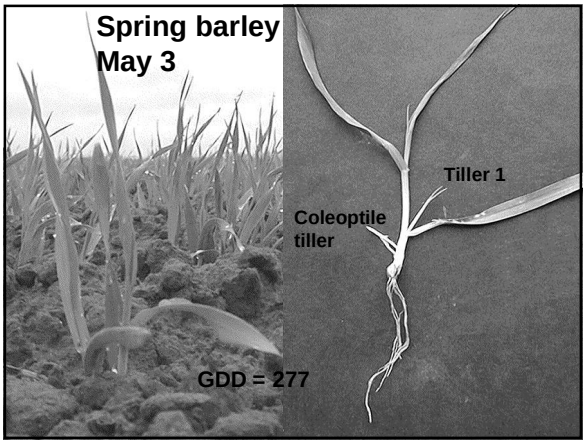
	^{0}C	^{0}F
Winter Wheat	100	180
Spring Wheat	80	144
Spring Barley	70	126

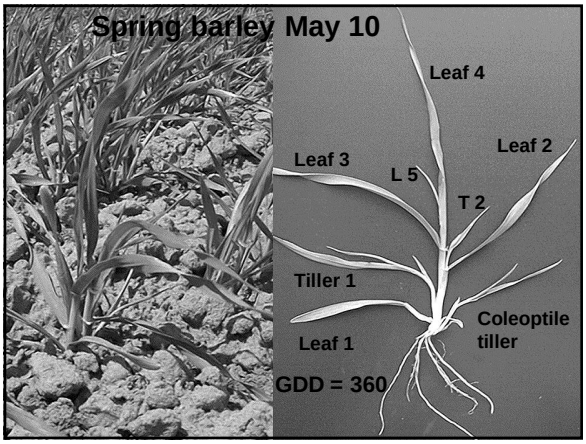


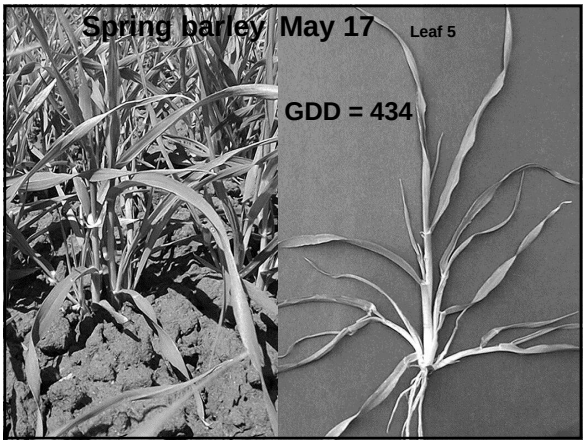


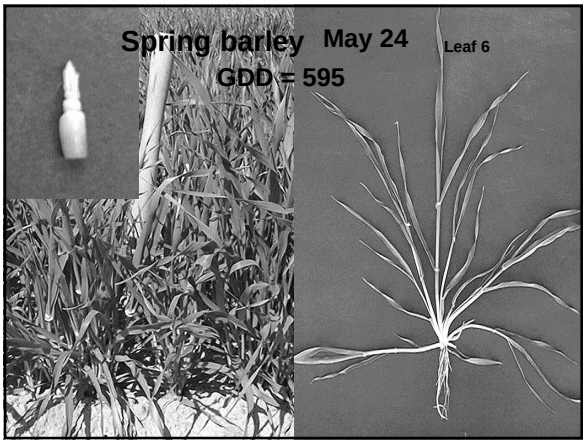

Cumulative GDD, Aberdeen 1999-2001
1999
2000
2001
GDD
1400
1200
1000
800
600
400
200
0
4/20
4/26
5/3
5/10
5/17
5/24
6/1
6/7
6/14


Spring Barley
April 26
GDD = 177


Spring barley
May 3
Tiller 1
Coleoptile
tiller
GDD = 277


Spring barley
May 10
Leaf 4
Leaf 2
Leaf 3
L 5
T 2
Tiller 1
Coleoptile
tiller
Leaf 1
GDD = 360

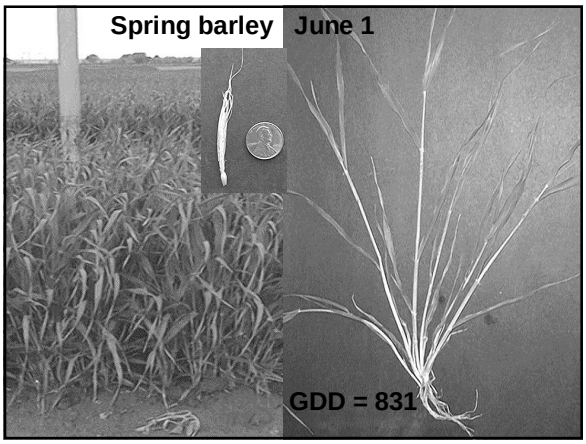

Spring barley
May 17
Leaf 5
GDD = 434


Spring barley
May 24
GDD = 595
Leaf 6

Jointing has started, head is 2" above soil line

Tiller initiation is likely complete, some will not survive to produce grain

Maximum grain yield has been determined



Head is 8-10 inches above ground
Beginning of most rapid dry matter accumulation and nutrient uptake
Stress will reduce tiller number and head size
Flag leaf is beginning to emerge from sheath

Recommendations

- Plant as early as soil conditions permit
- Use good seed
- Seed at the proper rate
- Soil test for nutrients, fertilize for crop rotation and expected yield
- Irrigate for crop needs
- Understand crop growth stages

Critical inputs

- Good seed
- Adequate nutrients
- Adequate soil moisture
- Good scouting and management
- Harvest to avoid skinned and broken kernels