### Winter Wheat Facts (NASS-ID)
- **Harvested Area**
  - 2020 – 660,000 acres
- **Yield**
  - 2020 – 101 bu/A
- **Production**
  - 2020 – 60,660,000 bu
    - 60 lb = 1 bu

### Growth and Development
Using Feekes Growth Scale - Vegetative stage is through Feekes 5, reproductive stage begins at 6

- **Germination** – when seed is exposed to adequate moisture, oxygen, and temp.
- **Seedling growth** – until 9 or more leaves have unfolded
- **Tillering** – from 1 to 5 tillers
- **Stem elongation** – starting from detection of 1st node
- **Booting** – flag leaf sheath extended to first visible awns
- **Inflorescence emergence** – spikelet visible to complete emergence
- **Anthesis** – 5 to 7 days after heading, beginning to completion of flowering
- **Milk** – kernel development to late milk
- **Dough** – early (mealy), soft to hard dough
- **Ripening** – kernel approaches harvest moisture (hard dough to harvest ready)

### Rotation and Seeding
- Wheat grows well in rotations – not recommended after corn or small grains when alternatives are available
- Good seed-to-soil contact is needed
- Seed depth should be 1 to 1.5 in under irrigation and good soil moisture
- Row-spacing of 6 to 8 in with commercial drills provides good distribution of seed
- Seeding Rate*
  - Irrigated: 1 – 1.2 million seeds per acre (60 to 120 lb/A based on seed weight)
  - Dryland: 700,000 seeds per acre (50 to 85 lb/A)
- Increased seeding rates recommended with delayed planting or poor seed bed.

**Optimum Planting Date Estimates**

<table>
<thead>
<tr>
<th>Location</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treasure Valley</td>
<td>Late Oct to mid-Nov</td>
</tr>
<tr>
<td>Magic Valley</td>
<td>Mid-Oct to early Nov</td>
</tr>
<tr>
<td>Upper Snake River Plain</td>
<td>Late Sept to late Oct</td>
</tr>
</tbody>
</table>

### Irrigation
- Time to meet ET, seasonal crop needs

- Greatest yield reduction occurs with moisture stress at:
  - Tillering
  - Boot to flowering
- Evapotranspiration (ET)
  - ~ 15 to 19 in of water
  - Peak ET occurs in late May to mid-June at heading and decreases after soft dough
- Water Holding Capacity (WHC) – the amount of water held in soil for crops
  - Soil texture WHC estimates
    - Loamy > 2 in/ft
    - Sandy loams 1 to 2 in/ft
    - Sandy < 1 in/ft
- Available Soil Moisture (ASM) – the difference between existing soil moisture content and permanent wilting point
  - ASM can be estimated by subtracting ET from the WHC if the soil profile WHC and soil moisture lost to ET are known
- Center Pivot Systems
  - Early season - supply soil root zone with moisture
  - Late season, pivot may not supply sufficient water to keep up with ET in which case additional soil water reserves will be needed
Surface Irrigation Systems
- 1st irrigation should occur at 50% ASM (earlier on sandy soil)
- At least 50% ASM maintained from tillering to soft dough

**Fertilization**

- Soil Sampling
  - One to two weeks prior to planting
  - 0- to 12 in and 12- to 24 in sample depth for nitrogen (N) and sulfur (S) separated by depth
  - 0- to 12 in for other nutrients
- Estimate of Nitrogen rate - 2.0-2.5 units N/bu yield based on:
  - Inorganic soil test N
  - Mineralizable N from OM = 30-60 lbs/A (often estimated at 45 lb N/A)
  - Crop residues
    - Potato/sugarbeet/onion residue is accounted for by soil test
    - Alfalfa provides an additional 40 to 80 lb N/A not measured in early season soil tests
  - Small grain residue - ADD 15 lb N for each ton of residue returned to soil (up to 50 lb N/A)
- Application timing
  - Loamy soil – single preplant or 40% preplant, 60% at tillering
  
Sandy soil – split 40% preplant, 60% at tillering
- No additional N recommended after tillering for SWW

Phosphorus (P, P₂O₅) - pounds of P₂O₅ applied based on soil test and percent free lime.

<table>
<thead>
<tr>
<th>Olsen Soil Test (0-12 in)</th>
<th>Percent free lime</th>
</tr>
</thead>
<tbody>
<tr>
<td>ppm</td>
<td>lbs P₂O₅/acre</td>
</tr>
<tr>
<td>0</td>
<td>240</td>
</tr>
<tr>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

- Potassium (K, K₂O)
  - Response can be expected in soil with <75 ppm K (0-12 in sample)

- Sulfur (S, SO₄)
  - 0- to 24 in sample depth
  - At < 10 ppm (or <35 lb/A) and with low-sulfur irrigation water
  - 20 to 40 lbs/A of sulfate-based fertilizer can result in yield response

Growth Regulators
- Ethephon (Cerone) and/or Palisade
  - Apply at labeled rates and timing to reduce lodging and plant height

Common Diseases
- Stripe rust, root rots (take-all, Fusarium crown rot, eyespot, Rhizoctonia), smut (loose, common and dwarf smut), bacterial blight, WSMV and Barley Yellow Dwarf, nematodes

Common Insect Pests
- Aphids, cereal leaf beetle, thrips, wireworms, armyworms and cutworms

Common Weeds
- Annuals: wild oat, green foxtail, kochia, common lambsquarters, redroot pigweed, feral rye, jointed goatgrass, wild buckwheat, downy brome (cheatgrass), Russian thistle, mustards
- Perennials: Canada thistle, field bindweed, quackgrass

Prepared by: J.M. Marshall, C.W. Rogers, A. Rashed, O.S. Walsh, X. Liang and A. Adjesiwor

References:
- NASS – National Ag Statistics, Idaho
- Robertson, Guy, Brown. 2004 Southern Idaho Dryland Wheat Production Guide UI AES BUL 827