2019 WATER TECH FINDINGS
FLICKNER AND GOERING FARMS

• GOAL IS TO IMPROVE WATER DUTY: BUSHELS/ACRE PER INCH OF IRRIGATION
• AND NOT REDUCE YIELDS, MAYBE EVEN INCREASE THEM
• AND IMPROVE INPUT EFFICIENCY OF FERTILIZERS ETC.

• 29 INCHES OF RAIN CREATED COMPACTION AND LOTS OF RUNOFF
• CROP NEEDS 25
• IRRIGATION WAS 5-7 INCHES BOTH FIELDS
# An Aerial View of Water Duty 2019

- **Pawnee Rock Area** 20” Rain
  - 8.9” Irrigation: 235 B/A 26.4 Water Duty
  - 13.7”: 205 B/A 14.9
  - 9.1”: 230 B/A 25.2
- **North of Greensburg**
  - 13.2”: 240 B/A 18.2
- **Macksville Area**
  - 12”: 232 B/A 19.3
  - 15”: 230 B/A 15.3
  - 15”: 198 B/A 13.2
### Zooming In on Water Duty

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
<th>Equipment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall Buhler-Moundridge</td>
<td>27-29”</td>
<td></td>
<td></td>
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<tr>
<td>Flickner MDI Pivot</td>
<td>6.3”</td>
<td>Irrigation</td>
<td>190 B/A</td>
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<tr>
<td>Corner Pivot</td>
<td>10”</td>
<td></td>
<td>226 B/A</td>
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<tr>
<td>Goering Home</td>
<td>6.8/5.8/5.4”</td>
<td>245 Plots</td>
<td>36/42/45</td>
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</table>
HOW TO GROW MORE WITH LESS

• IMPROVE USE OF RAINFALL TO MEET CROP ET
  • ACCURATE REAL TIME RAIN SENSORS
  • MODIFY IRRIGATIONS WHEN RAIN OCCURS DURING IRRIGATION IE SPLITS TO RE-ESTABLISH LAG
  • IMPROVE SURFACE STORAGE AND INFILTRATION
  • MONITOR DEEP MOISTURE BEFORE PLANTING
APPLY THE IRRIGATION EVENLY

- Make sure design flow and pressures are provided
- Low pressure operation occurs on about 30% of pivots in Kansas
- Monitor end tower pressure with technology like Agsense, Fieldnet
- Have a copy of sprinkler package chart. Details make a difference
MAKE SYSTEM PERFORM BETTER

• FLICKNER HAD PUMP IMPELLER ADJUSTMENT AND VFD CONFIGURATION ADJUSTMENTS
  TO IMPROVE PRESSURES AT END TOWER AND INCREASE EFFICIENCY
  AND REDUCE ENERGY KWDEMAND TO KEEP BPU COSTS DOWN BILLING KW<= 30

• GOERING HAD 2018 LOW PRESSURE PROBLEMS
  ADJUSTED IMPELLERS TO MAKE IT MORE EFFICIENT AND PRODUCE MORE PRESSURE
  REDUCED TOTAL PACKAGE FLOW RATE TO 675 FROM 750 BY 3 SPAN TREATMENTS
MONITOR SOIL MOISTURE

• INSTALLED SENSORS LIKE AQUASPY, SERVITECH, TRELLIS..ETC
• PLANT MONITOR SENSORS LIKE PYTECH
• NON-INVASIVE SENSORS LIKE AUTONOMOUS PIVOT
MONITOR LOCAL WEATHER
USE CROP WATER USE MODEL  KANSCHED

• GMD WEATHER STATIONS
• ON FIELD WEATHER STATION LIKE FARMERS EDGE

• CALCULATE CROP ET FROM ET GRASS OR ET ALFALFA
• NEED STAGE OF GROWTH, SOIL TYPE, INPUT IRRIGATIONS AND RAINFALL
TAKE AERIAL PICTURES

• TO LOOK FOR PATTERNS IN GROWTH AND LEARN FROM DIFFERENCES
• CERES AND TERRAVION ARE GOOD EXAMPLES
WHAT IS SUFFICIENT SYSTEM CAPACITY, GPM/ACRE

• 3, 4, 5, 6, 7 OR MORE?

• FIELDS WITH MINIMAL GPM/ACRE = BETTER WATER DUTY ???

• 4-5 MIGHT BE ENOUGH IF DECENT SOIL TYPE

• FLICKNER MDI 450 GPM/113 ACRES = 4.0 AND A WINDSHIELD WIPER 18 HR FC

• GOERING HOME 750/675/600 ON 3 TREATMENT SPANS
  • WELL IS SHARED BY 80 ACRE SDI ACROSS THE ROAD
  • JULY IRRIGATION CYCLE WAS 57 HOURS CORN (118 ACRE) 45 HOURS SDI
  • EVERY 102 HOURS JUST OVER 4 DAYS CYCLE REPEATED ALWAYS ON
  • 0.79” ON CORN THEN 0.62” ON SDI
  • EFFECTIVE PIVOT FULL CIRCLE = 445 GPM ALWAYS ON
FLICKNER FARMS / DAVES BIG PIVOT / CORN

PRE-VT DATE: 07/07/2019
MAP DATE: 07/24/2019, YIELD POTENTIAL: 185 bu/ac

Plot name: DAVE’S BIG PIVOT Corn

MONTHLY PLANT STATUS

MONTHLY STRESS DAYS
LOCATION VS. REGIONAL

MONTHLY IRRIGATION DAYS OF OPERATION

2019 SUMMARY
Ryan Goering - Home Qtr. - Corn
Komet Twisters 4.5' spacing and 4' height @ 90%

Soil Moisture Graph
Ryan Goering - Home Qtr. - Corn -- Komet Twisters 4.5' spacing and 4' height @ 90%

Zoom YTD 3 m 1 m 2 w 1 w 1 d

From May 16, 2019 To Sep 9, 2019

Graph showing soil moisture levels from May 24 to September 8, 2019, with different lines representing various moisture levels and events.