Introduction

- 123,000 dairy cows producing 2.34 billion lb of milk per year in FL representing more than US$ 700 million annually

- Feeding costs are among the highest costs in milk production

- Forages with superior productivity and quality can reduce feeding costs
Introduction

- Assuming a dairy cow with 1,500 lb, intake 4% BW, 35% forage in the diet
- This represents 21 lb DM of forage intake
- If we increase forage TDN from 55 to 65%, this would represent 2.1 lb of extra TDN, enough to produce an extra 7.4 lb milk/d (or 2,220 lb during the lactation), assuming no change in intake
- Multiply this by the number of lactating cows in your herd... This might represent the profit...
Introduction

- Information from research is important
- Implement the changes in the dairy
- Record keeping is essential not only in the cow herd, but also in the field crops
- Measure the yield and test forage quality!!!

Source: D. Harmon
Make sure you take advantage of the excellent information available at the website with data from the UF/UGA Corn Silage and Forage Field Day

http://animal.ifas.ufl.edu/corn_silage_forage_field_day_extension/2017/index.shtml

Make sure you also take advantage of the information available at the UGA with data from different variety trials of summer annuals and cool-season forages

http://www.swvt.uga.edu/
Forage Options

The “King” Corn

✓ Hard to beat in the spring planting: high productivity and good nutritive value

✓ 2017 FL test average: 8.6 t DM/acre and 71.9% TDN, 7.3% CP, 39.6% NDF, 53.9% NDF-dgy, 36.2% starch

Top-varieties of corn and sorghum – FL 2017 Variety test
The “King” Corn

How about the other 260 days of the year?

Corn (15 Mar – 30 Jun)

Sorghum, Sudan, Hybrids, Pearl Millet? Sunnhemp? Soybean?
Summer Planting Options

Top varieties within each group from 2015 UF Corn Silage and Forage Field Day; Pearl Millet data from UGA trial in Tifton

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December 23, 2014

Map showing the occurrence of *Melanaphis sacchari* in sorghum counties with color-coded areas indicating the years of occurrence.
Sugarcane aphids

• Sugarcane aphids might be a problem for sorghum and hybrids
• Resistant varieties coming to the market

![Image of sugarcane aphids]

Resistance of sorghum hybrids to sugarcane aphids

<table>
<thead>
<tr>
<th>Variety</th>
<th>Aphids sprayed</th>
<th>Aphids non-sprayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK537-07</td>
<td>118</td>
<td>112</td>
</tr>
<tr>
<td>83P17</td>
<td>114</td>
<td>108</td>
</tr>
<tr>
<td>R5260E</td>
<td>112</td>
<td>106</td>
</tr>
<tr>
<td>SP6929</td>
<td>116</td>
<td>110</td>
</tr>
<tr>
<td>W-844-E</td>
<td>114</td>
<td>108</td>
</tr>
</tbody>
</table>

Source: Brown (2016); LSU Ag Center (avg. yield across 3 locations in LA)

Sugarcane aphid-tolerant sorghum planted at UF IFAS NFREC in Marianna, FL August-2018

Losses can be high

Experimental line not available in the market (ADV XFO33)

http://animal.ifas.ufl.edu/corn_silage_forage_field_day_extension/2016/presentations/buntin.pdf
Transform WG

- Rate: 0.75 – 1.5 oz
- Max per crop: 3 oz per acre and 2 appl. per crop
- 14 d for grain; 7 d for grazing, forage, and hay

The value of crop-rotation

Avoid crop rotation with other grass species

Gallaher et al. (1991)
The value of crop-rotation

Adapted from McSorley and Dickson (1995)

<table>
<thead>
<tr>
<th>Nematodes per 100 cm³ soil</th>
<th>Fallow</th>
<th>Cowpea</th>
<th>Sorghum-sudangrass</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meloidogyne incognita 21 Sept.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>500</td>
</tr>
<tr>
<td>Meloidogyne incognita 16 May</td>
<td>0</td>
<td>0</td>
<td>500</td>
<td>2500</td>
</tr>
</tbody>
</table>

Yield losses caused by nematodes

Check EDIS ENY-001 with excellent information on how nematodes affect corn production in Florida
http://edis.ifas.ufl.edu/pdf/files/NG/NG01400.pdf

Noling (2016)

A corn field with patchy stunting and reduced stand from sting nematode. Photo credit: T. Jackson-Ziems, UNL.
Other non-grass options for crop-rotation

- **Summer annuals**

  Sunnhemp (*Crotalaria juncea*)
  
  Two varieties (Blue Leaf and Crescent Sun)
  
  Three seeding rates (15, 25, and 35 lbs/A)
  
  Two inoculation levels (with or without)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Herbage Accumulation (lb DM/acre)</th>
<th>IVOMD (%)</th>
<th>CP (%)</th>
<th>%Ndfa</th>
<th>BNF (kg N/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crescent Sun</td>
<td>2820 a</td>
<td>56.6 a</td>
<td>19.1 a</td>
<td>40 b</td>
<td>39 a</td>
</tr>
<tr>
<td>Blue Leaf</td>
<td>876 b</td>
<td>57.5 a</td>
<td>20.0 a</td>
<td>52 a</td>
<td>15 b</td>
</tr>
<tr>
<td>SE</td>
<td>218</td>
<td>1.5</td>
<td>0.6</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

LSMEANS followed by similar letter within the same column do not differ by PDFF procedure adjusted by Tukey (P > 0.05). IVOMD = In vitro organic matter digestibility; CP = crude protein; %Ndfa = percentage of N derived from atmosphere; BNF = biological N fixation.
Soybean

- Optimum planting dates range from late April until mid-June
- It may be planted through July into early August with narrow rows (10-20 inches) and irrigation
- Later maturing varieties should be planted if planted late
- Excellent information available at http://edis.ifas.ufl.edu/ag185
- Check last variety updates for late-planted soybean (planted in 3 August and harvested in 30 Nov) at http://www.swvt.uga.edu/2017/SYSR17/AP103-9-sy-ULP.pdf
- Best variety for late planting in Midville (GA) and Attapulgus (GA) was S58-Z4 from Syngenta

The “King” Corn

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>F</td>
<td>M</td>
<td>A</td>
</tr>
</tbody>
</table>
Other non-grass options for crop-rotation

• Alfalfa or alfalfa/bermudagrass mixture


Corn – Sorghum – Alfalfa in the Fall (1-2 yr)

On-farm data from Jackson County, FL, 2014

Irrigated alfalfa

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Average/cut (lb/acre)</th>
<th>Cumulative yield (lb/acre/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABT 805 Bulldog</td>
<td>1352</td>
<td>10817</td>
</tr>
<tr>
<td>Ameristand 803 T</td>
<td>1636</td>
<td>13089</td>
</tr>
<tr>
<td>WL Research 535 HQ</td>
<td>1594</td>
<td>12751</td>
</tr>
<tr>
<td>WL Research 550 RR</td>
<td>1742</td>
<td>13935</td>
</tr>
<tr>
<td>WL Research 656 HQ</td>
<td>1782</td>
<td>14256</td>
</tr>
<tr>
<td>WL Research 660 RR</td>
<td>1639</td>
<td>13114</td>
</tr>
<tr>
<td>WL Research 662 HQ RR</td>
<td>1799</td>
<td>14390</td>
</tr>
</tbody>
</table>
Alfalfa stands after two years in Marianna, FL
Picture taken in August 27th, 2015

Alfalfa and grass mixtures

Grass+N = 9,200 lb/A
FL99+grass = 8,227 lb/A

Total yield in Alfalfa/bermudagrass mixtures and controls (+/- N); Citra, 2014-2015.
Source: Dr. Patricio Munoz, UF/IFAS
Alfalfa and grass mixtures

Percentage of alfalfa in alfalfa/bermudagrass mixtures; Citra, 2014-2015.
Source: Dr. Patricio Munoz, UF/IFAS

Alfalfa and grass mixtures

• Hay, Haylage, or grazing Alfalfa-bermudagrass are possible options

Bulldog 505 Alfalfa on Alicia bermudagrass
Bulldog 805 Alfalfa/Tifton 85 Haylage

Photo credit: Dennis Hancock
Annual ryegrass, small grains, or both??

How about black oats?

- Black oats (*Avena strigosa*) has greater heat tolerance than regular oats
- This allows earlier planting and extended growth into the Spring
- Excellent nutritive value and high leaf-to-stem ratio
- Baleage, greenchop, or grazing
- Genetic diversification is important on forage resources – **reduce risks of disease outbreak**

Seed increase of black oat experimental lines in Marianna; 2018
How about black oats?

<table>
<thead>
<tr>
<th>Marianna</th>
<th>Shenandoah</th>
<th>UF Dairy</th>
<th>Silver Spurs</th>
<th>Ona</th>
</tr>
</thead>
<tbody>
<tr>
<td>UF-9</td>
<td>FL 401</td>
<td>UF-10</td>
<td>UF-6</td>
<td>FL 401</td>
</tr>
<tr>
<td>Legend 567 Oats</td>
<td>Earlyploid</td>
<td>UF-8</td>
<td>UF-7</td>
<td>UF-10</td>
</tr>
<tr>
<td>Earlyploid</td>
<td>UF-1</td>
<td>UF-2</td>
<td>UF-2</td>
<td>UF-9</td>
</tr>
<tr>
<td>FL401 Rye</td>
<td>UF-25</td>
<td>UF-3</td>
<td>UF-8</td>
<td>UF-4</td>
</tr>
<tr>
<td>UF-27</td>
<td>UF-8</td>
<td>UF-7</td>
<td>FL 401</td>
<td>UF-3</td>
</tr>
<tr>
<td>UF-2</td>
<td>UF-7</td>
<td>UF-1</td>
<td>UF-3</td>
<td>PST P-1020</td>
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<tr>
<td>UF-8</td>
<td>UF-3</td>
<td>Legend 567</td>
<td>UF-24</td>
<td>UF-6</td>
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<td>UF-4</td>
<td>UF-24</td>
<td>UF-9</td>
<td>UF-9</td>
<td>UF-1</td>
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<tr>
<td>UF-7</td>
<td>UF-4</td>
<td>UF-4</td>
<td>Trical 342</td>
<td>UF-2</td>
</tr>
<tr>
<td>UF-5</td>
<td>UF-26</td>
<td>FL 401</td>
<td>UF-5</td>
<td>Legend 567</td>
</tr>
</tbody>
</table>

IVOMD 75 – 80%
CP 18 – 22%

Black Oats DMY – UF Dairy

<table>
<thead>
<tr>
<th>Treat</th>
<th>lb/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>UF-10</td>
<td>4708</td>
</tr>
<tr>
<td>UF-8</td>
<td>4668</td>
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<tr>
<td>UF-2</td>
<td>4593</td>
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<tr>
<td>UF-3</td>
<td>4559</td>
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<td>UF-7</td>
<td>4537</td>
</tr>
<tr>
<td>UF-1</td>
<td>4481</td>
</tr>
<tr>
<td>Legend 567</td>
<td>4362</td>
</tr>
<tr>
<td>UF-9</td>
<td>4323</td>
</tr>
<tr>
<td>UF-4</td>
<td>4310</td>
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<tr>
<td>FL401</td>
<td>4111</td>
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<td>UF-6</td>
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<td>UF-27</td>
<td>3992</td>
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<tr>
<td>Trical 342</td>
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<td>3704</td>
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<td>UF-24</td>
<td>3696</td>
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<tr>
<td>01143 Triticate</td>
<td>3547</td>
</tr>
<tr>
<td>Soil Saver</td>
<td>3476</td>
</tr>
<tr>
<td>Earlyploid</td>
<td>3051</td>
</tr>
<tr>
<td>SE</td>
<td>429</td>
</tr>
</tbody>
</table>

*Preliminary data from UF Dairy 2018. Orthogonal contrast black oat vs. others P = 0.0285
Small Grains and Annual Ryegrass

Top cultivars within groups
avg. of 4 sites in 2018 (Tifton, Plains, Athens, and Marianna)

Annual Ryegrass DMY Distribution

Marianna, FL 2018
Date of planting: 10/26/2017

Too late??
How about mixing ryegrass and small grains?

- Within cool-season, there are different forage options.
- Mixing forages with complementary growth curves have potential to increase forage production during the cool-season, and reduce risks!

Small grains grow earlier in the season
- Cereal Rye FL 401
- Oat Horizon 201
- Triticale Trical 342

Ryegrass grows later in the season
- Prine Ryegrass

Dubeux et al. 2016

Grazing Dairies
Perennial Warm-season Grasses

- Bermudagrass (Tifton-85, Jiggs, and new promising lines)
- Stargrass for south Florida
- Cool-season forages (small grains and ryegrass)

Bermudagrass variety trial at UF-IFAS NFREC, Marianna, FL.
Photo credit: Jose Dubeux Dubeux et al. (2017)
Bermudagrass

Bermudagrass variety trial at UF-IFAS NFREC, Marianna, FL.

Photo credit: Jose Dubeux

Dubeux et al. (2017)

Advantages:
• High DMY when well-adapted to the site
• High forage quality when grazed at 4-week intervals (or less)

Disadvantages:
• Rapid decline in forage quality after 6 weeks
• Less cold tolerance than bermudagrass (recommended for south of I-4)

Stargrass

Advantages:
• High DMY when well-adapted to the site
• High forage quality when grazed at 4-week intervals (or less)

Varieties: Ona, Florona, Florico

Disadvantages:
• Rapid decline in forage quality after 6 weeks
• Less cold tolerance than bermudagrass (recommended for south of I-4)

Vendramini and Mislevy (2017)

Animals grazing stargrass in Ona, FL
Photo credit: J. Vendramini
Overseeding warm-season grass pastures

• Warm-season perennial grasses can be overseeded during the cool-season
• Options are small grains, annual ryegrass, and clovers
Take Home Messages

• Forages are the base for a sustainable dairy production

• Improvements in forage quality might represent the profit

• Crop-rotation is important to sustain corn productivity; ideally rotate it with non-grass forages

• Florida has unique opportunities to produce forages! Take advantage of it!!

Thank you!
dubeux@ufl.edu