Crops 1 – Building Soil Health

Ben Bartlett DVM
MSU – Extension
Dairy & Livestock

Setting the Stage

- Drought last 3 years
- Risk management
- Diversity – “decreasing the risk”
- Whole Farm thinking

Whole Farm thinking

- Not a “crop” issue
- A crop + cow feed + harvesting + using manure + labor + local market + soil type + farm machinery + etc. issue

Diversity – "decreasing the risk"

- "don't put all your eggs in one basket"!
- Impact of more corn acres due to ethanol
  - MSU Research – 4 state study shows:
  - Inc. corn acres = Dec. in beneficial insects
  - More corn- less ladybugs- more soybean aphids
  - Cost – $240 million

Cow Calf Buffet
Work from Utah State University

- Research on mono species vs mixed pastures
- Kind of pasture

Kind of pasture	Calf ADG	Cow BCS
Mixed	3.65	+0.40
Tall Fescue	3.51	+0.25
Alfalfa	2.98	-0.36
BFT	3.47	+0.33
Meadow Brome	3.42	+0.28

Recommend- 50% fescue/37.5% Alf/12.5% BFT

U of Melbourne – optimal digestion @ .7clover:.3grass

Diversity – "decreasing the risk"

- Genetic defects in cattle
  - Mule foot in Holsteins
  - Curly calf or AM in Angus
- Not all customers want the same thing
  - In 2004 Heritage Foods was a $1,000 organization
  - Today – $5 million organization
- Diversity = a "genetic savings account" for unforeseen problems / challenges

Soil Health & Diversity
Dr. Jill Clapperton

- “Living in the soil are plant roots, viruses, bacteria, fungi, algae, protozoa, mites, nematodes, worms, ants, maggots and other insects and insect larvae (grubs), and larger animals: the soil biota. Indeed, the number of living organisms below ground is often far greater than that above ground.”

- “Soil fertility is largely dependent on the processing of organic substrates – residues or soil organic matter (SOM)”

- “Including a perennial forage, or to a lesser extent an annual forage, in the rotation can enhance soil structural stability, increase soil organic matter – to depth, and increase the number, diversity and activity of most soil organisms.”

Drought – Risk – Diversity

You Need A “Whole Farm Plan”
Dr. Larry Dyer – will discuss with
Knowledge – Experience – Research
How – Soil Health
Is the *Foundation* of that W.F.P.

Soil Health & Diversity

- MANAGING THE SOIL AS A HABITAT - DR. JILL CLAPPERTON
-
- When we are standing on the ground, we are really standing on the roof top of another world. Living in the soil are plant roots, viruses, bacteria, fungi, algae, protozoa, mites, nematodes, worms, ants, maggots and other insects and insect larvae (grubs), and larger animals: the soil biota. Indeed, the number of living organisms below ground is often far greater than that above ground. Together with climate, these organisms are responsible for the decay of organic matter and cycling of both macro- and micro-nutrients back into forms that plants can use. The activities of the soil biota stabilise soil aggregates building a better soil habitat and improving soil structure, tilth and productivity, and hence the primary productivity of the ecosystem that they inhabit. Not only that- plants can take-up and use nutrients made available through biological processes more easily and efficiently compared with chemical fertilizers. Soil fertility is largely dependent on the processing of organic substrates - residues or soil organic matter (SOM)- through the soil food-web. Soil biota require the maintenance of a suitable soil habitat, with an adequate quantity and quality of organic matter as an essential food source. nutrient content of the crops we grow. Including a perennial forage, or to a lesser extent an annual forage, in the rotation can enhance soil structural stability, increase soil organic matter - to depth, and increase the number, diversity and activity of most soil organisms. In agriculture, we modify the soil habitat with tillage and crop rotation practices, and grazing, and so influence the ability of the soil ecosystem to provide essential services such as decomposition and nutrient cycling. This in turn, can affect the nutrient quality of the food and forages we produce, and ultimately human and