## Alternative Forage or Cover Crop? The Best of Both Worlds

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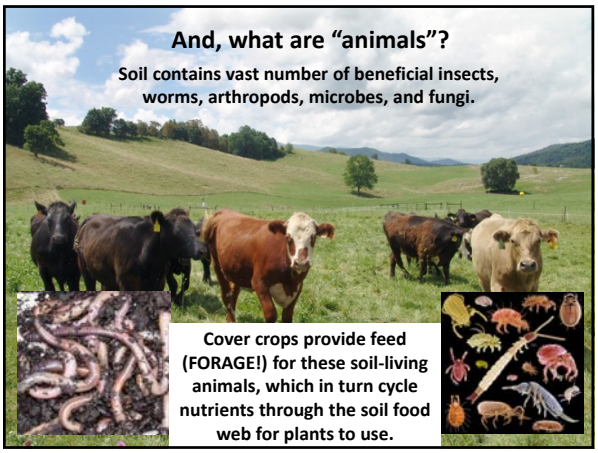
## And, what are "animals"?

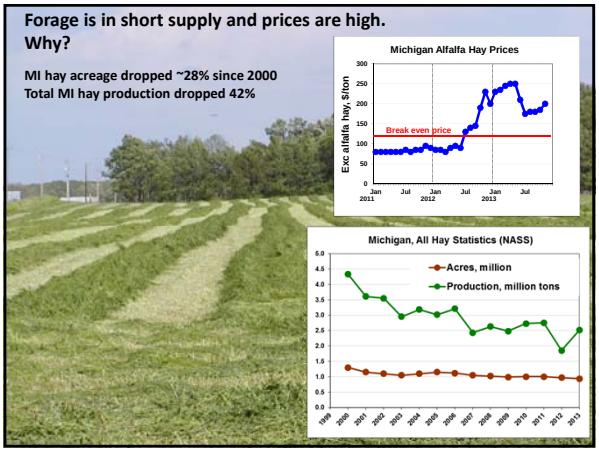
Soil contains vast number of beneficial insects, worms, arthropods, microbes, and fungi.



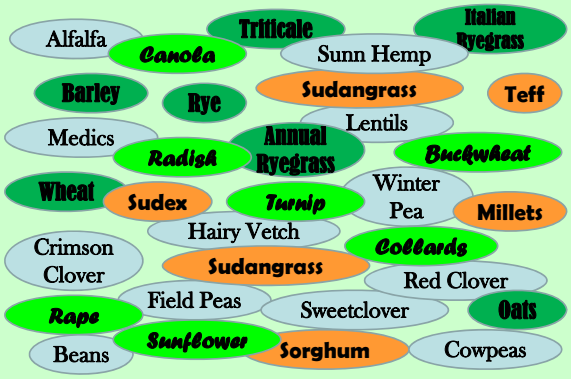
Cover crops provide feed (FORAGE!) for these soil-living animals, which in turn cycle nutrients through the soil food web for plants to use.

## Forage is in short supply and prices are high. Why?

MI hay acreage dropped ~28% since 2000
Total MI hay production dropped 42%




## Is it a cover crop, or an alternative forage?




## What exactly <u>are</u> forages, anyway?

Is there more than just alfalfa, corn silage, and perennial grass?

"edible parts of plants, other than separated grain, that can provide feed for animals, or that can be harvested for feeding"

The only biological difference between a cover crop and an alternative forage is…

whether you will harvest any of it for aboveground livestock (forage) or leave it all for the underground "livestock" (cover crop).

# Caution!

Be aware of use restrictions on cover crops planted under crop insurance programs.

New Farm Bill will change the current policy.

Two different timing scenarios

1) During active cover crop growth period:

Mechanical harvest and grazing are allowed as long as sufficient regrowth occurs to meet residue targets at time of cover crop termination.

Examples:

1) YES-graze rye in fall, let it grow back in spring before termination
2) NO – graze turnips late in fall, destroy crowns, no regrowth

## Characteristics of ideal alternative forage crops for short rotations between row crops

1) Fast-growing, vigorous seedlings
2) Reach harvestable biomass within 60 days
3) Does not self-seed
4) Acceptable nutritive value (energy, protein, minerals)
5) Acceptable toxicity risk
6) Acceptable preservation characteristics as hay or silage
7) Regrowth after harvest

# Caution!

2) At termination:

- Michigan (Zone 4) cover crops must be terminated no later than 5 days after planting of the insured crop.
- Cover crop termination methods must result in NO REGROWTH.
- Methods: herbicide, tillage, winterkill
- Mechanical harvest (hay, silage) is allowed as a termination method as long as NO REGROWTH occurs after harvest
- Grazing allowed as termination method ONLY IF you have three years of on-farm documentation that grazing as termination does not reduce your crop yields AND letter of approval from two ag experts. Consult your insurance agent.

## Where are the opportunities on your farm?

Cover crops can be planted anytime soil is exposed

- After row crop harvest (corn, soybean, wheat)
- Into existing row crop (frostseed, fly on)
- Nurse crops protect new perennial seedings

Many can be ready to graze or cut (brassicas, sorghums, teff) within 45-60 days

## Cover Crop Benefits of Forages

- Suppress weeds
- Fix nitrogen (legumes, via roots!)
- Prevent erosion (roots!)
- Build soil organic matter (roots!)
- Improve soil physical structure (roots!)
- Capture and hold soil nutrients (roots!)
- Increase water infiltration and holding capacity of soils (roots!)
- And much more

## Fertility Considerations for Alternative Forages

Soil pH – >6.0 for brassicas and grasses
>6.5 for legumes

Nitrogen – yield improves with 25-50 lb/acre of N at planting for brassicas and grasses

Phosphorus & Potassium

- Soil Test!
- Hopefully adequate on well-maintained row crop ground
- On poor ground, follow soil test

Boron – may be needed for brassicas on sandy or low OM soil

## Can I ensile (*insert name of plant here*)?

In most cases, YES!

Critical requirement for successful ensiling
Must be able to reduce crop moisture to less than 70-80% at the silo
- Brassicas are too wet (80 - 95% moisture in field)
- Possibly mix with dry material at silo?

Reliable alternative silage crops for Michigan
- Forage sorghum, sudangrass, or sudex (use BMR varieties)
- Oats/pea, triticale

## Small Grains


- Oats, triticale, wheat, rye, barley
- Days to harvest: 60 to 90
- When to plant: April to October
- Seeding rate: 80 to 120 lb/acre
- Potential DMY: 1.5 to 3.5 ton DM/A over 1-2 cuts
- Forage quality: moderate to excellent
- Greater forage quality when grown in cool versus warm weather
  1) Cool weather delays maturity
  2) Cool weather increases WSC accumulation in oats (up to 24%)

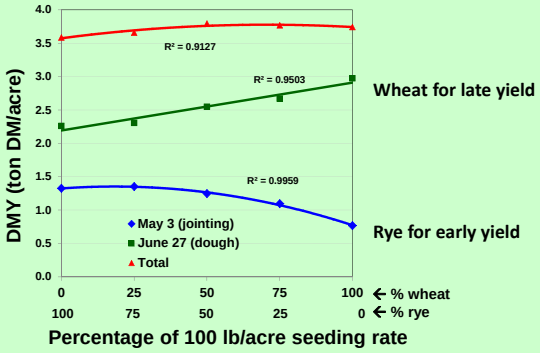
## What could go wrong?

Concerns with any type of forage (pasture, hay, silage)
- Weeds
  - Some cover crops can self-reseed
  - Annual/Italian ryegrass, cereal rye, hairy vetch, buckwheat
- Nitrate toxicity – sorghums, small grains, brassicas
- Photosensitization – buckwheat
  - keep buckwheat forage under 30% of ration
  - keep cows out of sun

Concerns on Pasture
- Bloat – wheat, annual clovers, medics, brassica
- Photosensitization – immature forage rape
- Neurological problems/dermatitis – hairy vetch
- Prussic acid poisoning – sorghum, sudangrass

Concerns with Hay/Silage
- Vitamin K deficiency -- sweetclover hay or silage (moldy)

## Wheat/Rye Mixtures for Early Spring Forage




## Does traffic on cover crops cause soil compaction?

Does hoof or wheel traffic cancel out soil-structure benefit of cover crop?

It depends…
- Surface compaction can occur if animals are present while ground is wet
- Freeze-thaw cycle tends to correct the compaction

Methods to reduce compaction risk from harvesting cover crops
1) Use no-till
2) Stay off wet ground
3) Graze while ground is frozen

## Sorghum, Sudangrass, Sorghum-sudangrass

- Days to harvest: 45 to 90
- When to plant: 60-65 F soil temperature
- Seeding rate: 5-25 lb/A sorghum, 20 lb sudax, 25 lb sudangrass
- Potential DMY: 3-10 ton DM/A in 1-2 cuts
- Forage quality: ~80% of corn silage (more protein, less energy), best with brown midrib varieties

- Nitrate toxicity
  1) $NO_3$ accumulates when soil N is high and plant growth is slow (cool or drought)
  2) Ensiling reduces $NO_3$ by ~50%
  3) $NO_3$ is not reduced in hay
- Prussic acid toxicity
  1) Not an issue in FULLY-CURED hay and silage
  2) Avoid grazing immature (new shoots < 18" long) or wilted sorghums

## New Developments in Forage Sorghums

- Dwarf varieties with BMR-6 genetics
- High sugar, high fiber digestibility
- Arguably better nutrient profile for dairy cattle than conventional sorghum

- Reduced lodging
- Planted at greater densities (25 lb/acre versus 5-10) and narrower rows (6 inches)
- Harvestable forage in 28 days?

## Brassica forage quality

Nutritive value of brassica forage compared to grass pasture, alfalfa pasture, corn silage, and corn grain.

| | DM, % | CP, % | NDF, % | NFC, % |
|---|---|---|---|---|
| Turnip leaf | 4-22 | 7-33 | 11-44 | 10-58 |
| Turnip root | 8-20 | 4-23 | 17-35 | 20-81 |
| Forage rape | 4-23 | 5-31 | 13-43 | 9 - 46 |
| Grass pasture | 15-35 | 7-34 | 39-79 | 10-20 |
| Alfalfa pasture | 25-35 | 16-35 | 35-67 | 20-30 |
| Corn silage | 35-40 | 7-11 | 45-55 | 30-40 |
| Corn grain | 88 | 10 | 9.5 | 75 |

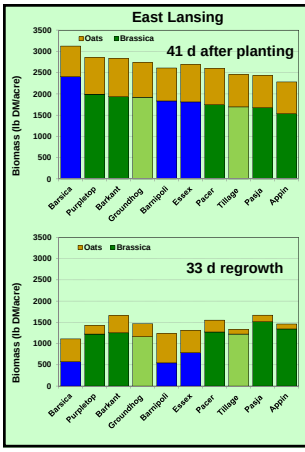
Compared to corn silage, brassicas have less NDF, more CP, and similar/greater NFC.

## Annual & Italian Ryegrass

- Days to harvest: 60 days after planting, 30-45 days for regrowth
- When to plant: April - September
- Seeding rate: 10-20 lb/acre
- Potential DMY: 2 – 4.5 ton/A over multiple cuts
- Forage quality: excellent
- Best use: silage or pasture

- Annual 'Westerwolds' ryegrass heads out the same year planted
- Italian ryegrass is biennial … IF it doesn't winterkill
- Aggressive self-seeder that easily develops roundup resistance, can escape to become weed problem in subsequent crops if allowed to head out

East Lansing




30-d regrowth

- Poor for "pure" rapes, but oats filled in the gap
- Similar for turnips, turnip-rape hybrids, and radish

## Brassicas

- Days to harvest: 60-90 days
- When to plant: April - August
- Seeding rate: 3-4 lb/A
- Potential DMY: new rape-kale hybrids, up to 5.5 ton DM/acre
- Forage quality: excellent, similar to corn


- Excellent pasture
- Ensile only if mixed with a higher DM forage to improve fermentation and reduce effluent

- Canadian producers report that canola makes poor hay at ripe seed stage

- Brassicas should never be fed as the only forage because they are too low in effective fiber. Always provide hay, intercropped grass, or access to permanent pasture.

Great Lakes Forage & Grazing Conference
March 6, 2014
East Lansing, Michigan
"Building Soil with Forages"
Keynote Speaker: Gabe Brown

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## Teff grass

- Fine-stemmed, leafy warm-season annual grass
- Days to harvest: 50 days after planting, 40 days for regrowth
- When to plant: June - July
- Seeding rate: 4 – 12 lb/A
- Potential DMY: ~2000 lb DM/A per cut, multiple cuttings
- Forage quality: good
- Used as hay, silage, and pasture
- Will be killed by hard frost

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