Low till vegetable production

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What is tillage?

- Refers to soil preparation
  - Primary rough pass
    - Usually deeper
    - Fall or spring for incorporating detritus
  - Secondary finishing passes
    - Usually shallower
    - Spring for seed beds

- Mid-season mechanical weed control is often called “cultivation”
  - Selectively leaves your crop, and removes weeds
  - Sometimes the same tools are used as secondary tillage

Why low till? Depends on goals

- Reduce field time.
- Improve soil by decreasing disturbances, and increasing microbial activity.
- Save soil from leaving the field by providing roots and water stable aggregates.
- Potential moisture and nutrient bank.
- “Less work”, or “no work” gardening through layering because of lack of tools or time.

Why low till? Depends on goals

A few factors affect success

- Timing of tillage
- Cover crops that behave and their timing
- Crops that are more amenable for it
- Tools you will need
- Scale dependent items

Timing of tillage

- Easiest adjustment to make

- Combine processes with primary and secondary tillage
  - Incorporate manures, P and K fertilizers, pH adjusters in fall primary tillage
  - Incorporate P, K, and N fertilizers, and certain pest management chemicals during spring secondary tillage

Cover crops that behave

- Sometimes you may intentionally put more plants in the ground, instead of tilling.

- It is important that they can be managed to avoid competition with main crop.

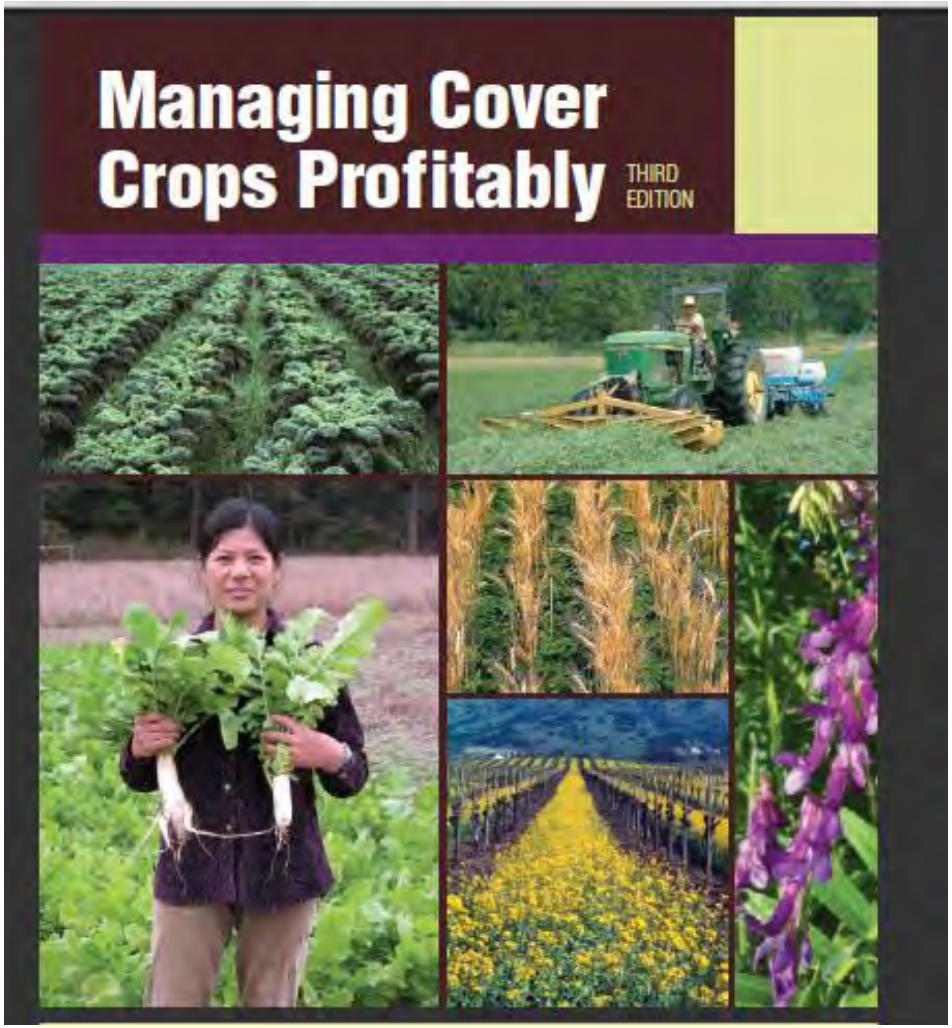
Cover crops that behave

- Winter-killed cover crops
  - Oats, barley, peas, radishes, mustards, some clovers
- Winter-surviving cover crops
  - Winter wheat, winter rye, vetch (sometimes), red and white clover
- Living mulches
  - Spring rye, teff, red and white clover

Cover crop timing

- Can wait until crop is entirely removed
- Can overseed or frost seed if that does not take away from harvest through competition

http://www.sare.org/publications/covercrops/covercrops.pdf



Crops that are amendable to it

- Crops that are mostly removed during harvest leave a “rough tilled” field with broadcast seeding potential.
  - Root crops
- Crops that leave decomposing residue after harvest can be overseeded before the canopy closes.
  - Beans, corn, vine crops, tomatoes/peppers/eggplants, celery, lettuce, cole crops
  - “woody” species need time to break down: cole crops, peppers, corn
- Crops that are tall, or spreading can stay ahead of unruly living mulches or weed escapes better.
- Large-seeded crops (corn, beans, pumpkins, etc) can be direct seeded into residue better than small seeded crops (carrots, cabbage, lettuce, etc).
- Plugs can be transplanted into residue with proper machinery.

Tools you will need

- If you are leaving cover crop residue between crop rows
  - Broadcast or drill seeders for planting cover crop before main crop
  - Rolling cultivators better for high residue
    - Hillsides, Lillistons, rotary hoes
  - High residue planter or transplanter for crop

Tools you will need

- If you are using a living mulch between crop rows
  - Regular crop planter/transplanter
  - Broadcast seeders for mulch crop after crop is up
  - Irrigation
  - Mowers for wide-spaced crops, or plasticulture beds

Tools you will need

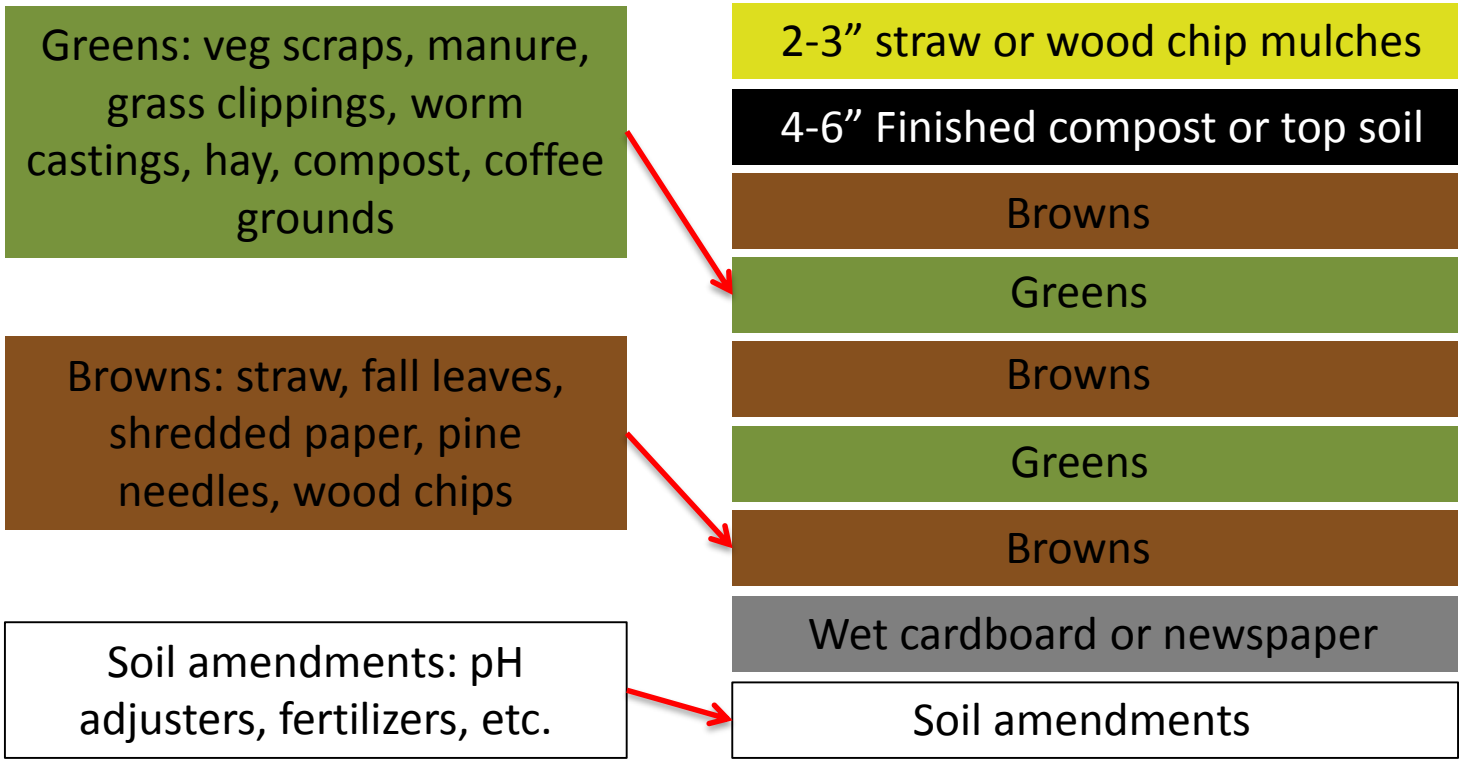
- Herbicides
  - High residue systems automatically reduce good mechanical control options.

Scale dependent items

- Lasagna or “No-work” gardening
  - Constantly layering dying vegetation, manure, compost, and straw or newspaper
- Mulch machines for broadcasting bales
- No-till and strip-tilling machines
- No-till planters/transplanters

Cover/Mulch Examples

Lasagna, Ruth Stout, or “No-work” gardening



Cover/Mulch Examples

Lasagna, Ruth Stout, or “No-work” gardening

Cover/Mulch Examples

White clover between cole crops

Cover/Mulch Examples
Red clover between vine crops

Oregon State University

Cover/Mulch Examples

Zucchini on plastic with spring rye

Cover/Mulch Examples

Corn with white clover

Sept 23

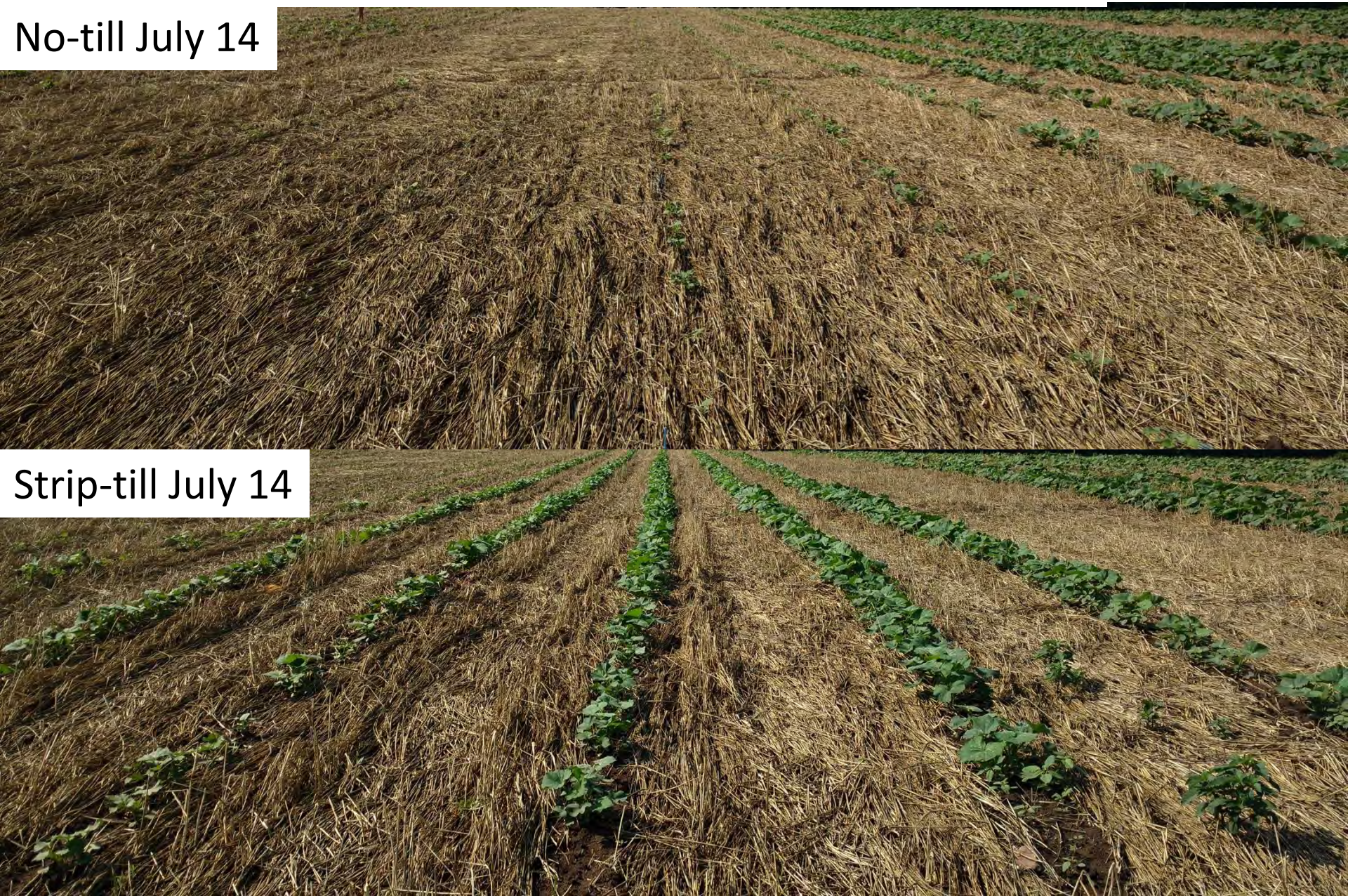
Cover/Mulch Examples

Corn with white clover

Oct 27

Cover/Mulch Examples

Butternut squash seeded into winter rye – Planted June 13



Cover/Mulch Examples

Butternut squash seeded into winter rye – Planted June 13

No-till Sept 12

Strip-till Sept 12

Cover/Mulch Examples

Butternut squash seeded into winter rye – Planted June 13

No-till Oct 7

Strip-till Oct 7

Cover/Mulch Examples

Butternut squash seeded into winter rye – Planted June 13

Roll only, followed by Sandea + Select Max rescue treatments

Hand-weeded plots

Equipment Examples

Air seeder/sprayer mod

Equipment Examples

Air seeder/sprayer mod

Equipment Examples

Seed drill

Equipment Examples

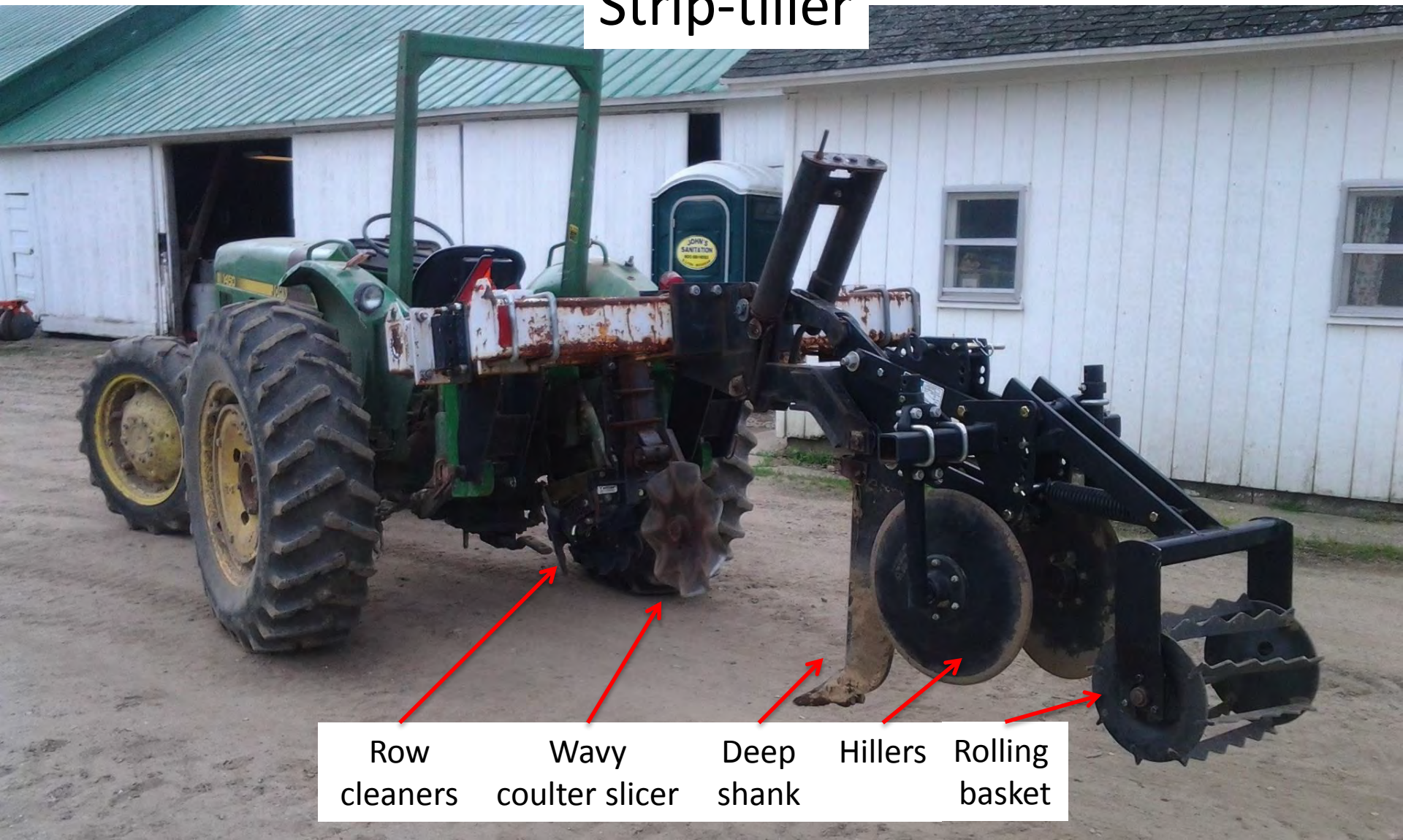
Roller-Crimper

Equipment Examples

Flail mower

Equipment Examples

Strip-tiller



Equipment Examples

No-till planter

Spiked closing wheels

Seed openers

Wavy coulter to slice more

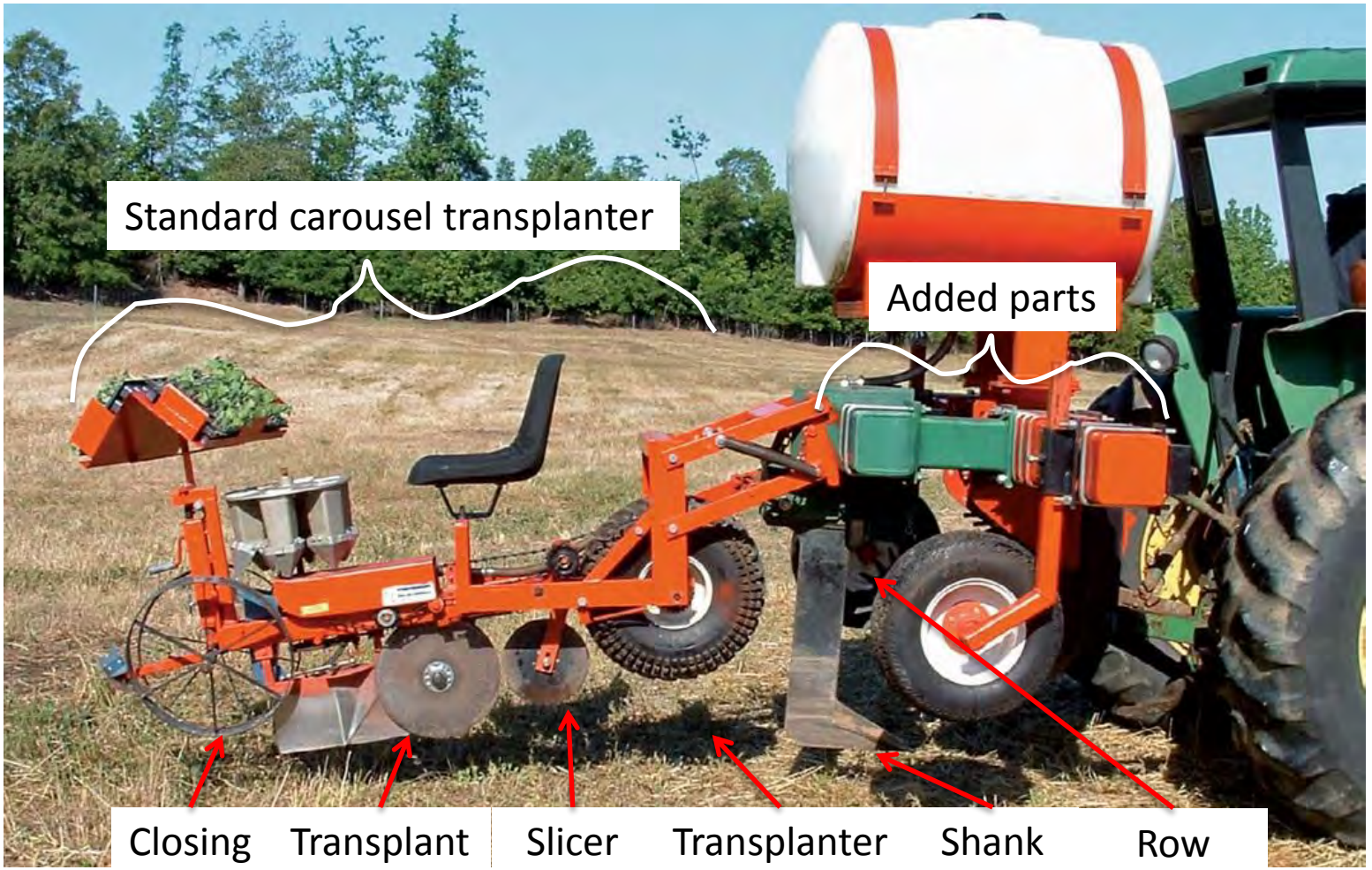
Fertilizer openers

Residue slicers

Row cleaners

Equipment Examples

No-till transplanter



Equipment Examples

Bale chopper

Equipment Examples

Rotary Hoe

Can work in residue up to 60% soil coverage

Can travel 7-10 mph

Equipment Examples

Rolling Cultivator

High speed

Adjustable for more or less soil action, hilling, or throwing

Similar to rotary hoe when set in close gangs and straight.

Hillside Cultivator

Lilliston Cultivator

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