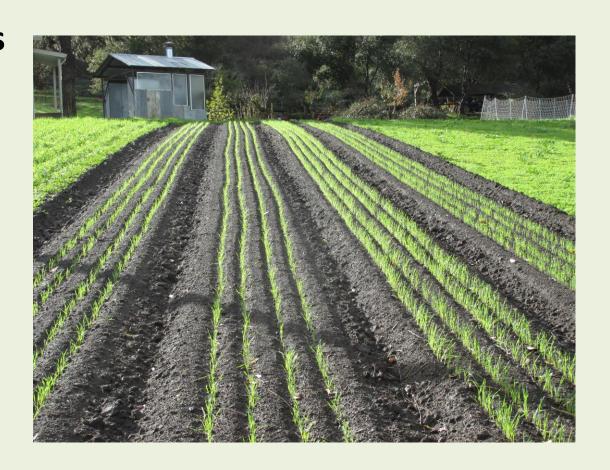
Improving Efficiencies in our Cropping Systems

Santa Rosa Jr. College - Shone Farm, May 21st 2015



Presentation outline:

- Soil management basics
- Tractor configurations / bed spacings
- Soil compaction challenges
- Tillage systems
- Bedding systems



Terminology:

- soil texture
- soil structure
- "powdered"
- "slicked"
- cloddiness
- crumb structure
- aggregation
- flocculation
- compaction
- controlled traffic



Sustainable soil management and Good seedbed preparation involves:

- Well thought out crop rotations
- Good understanding of soil moisture assessment
- Knowledge of soil characteristics
- Proper tools and good timing
- Cover cropping
- Use of appropriate amendments

Tillage challenges:

- energy intensive
- capital intensive
- causes compaction



- causes surface crusting
- requires significant skill and training
- alteration of soil food web shifting populations away from larger, longer lived organisms to smaller, shorter-lived organisms

Tillage facilitates:

- Soil conditioning
- Seed bed preparation
- weed management
- residue management
- Water holding
- Stimulation of nutrient release
- Increased soil temperatures



Untilled "fallow" Good "structure"

Freshly tilled soil: integrity impacted

Compacted: wheel traffic foot traffic



1 1

Low BD

Tillage depth

subsoil

Tillage depth

subsoil

High BD

Tillage depth

subsoil

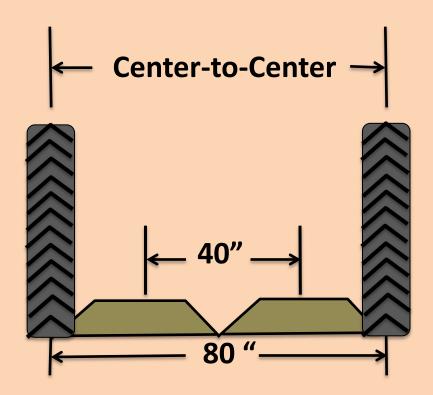
Bulk density = dry weight of soil divided by its volume

Bulk density is a measure of pore space

As bulk density increases pore space decreases

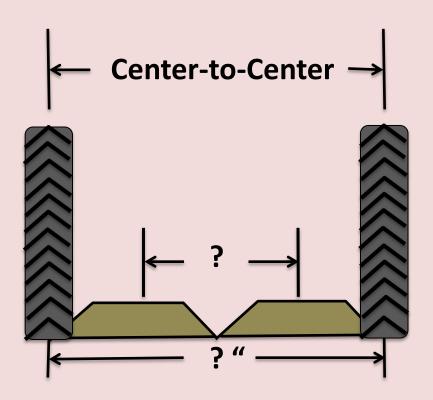
Understanding bed spacing

- Bed spacing typically based on tractor tire spacing
- Tractor tire spacing measured from "Center-to-Center" of tire
- Bed spacing same as "Center-to-Center" tire spacing (single bed)
- Bed spacing ½ of "Center-to-Center" spacing (double bed)

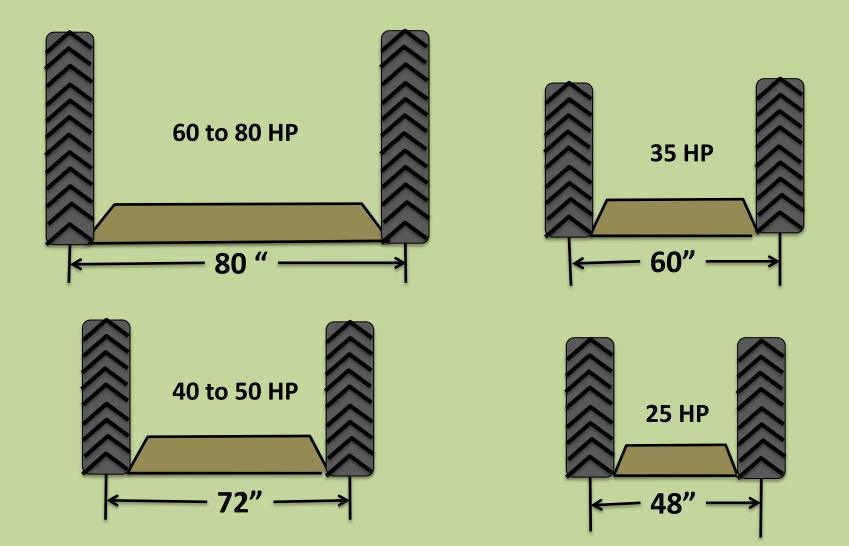


How do you determine the optimum bed spacing?

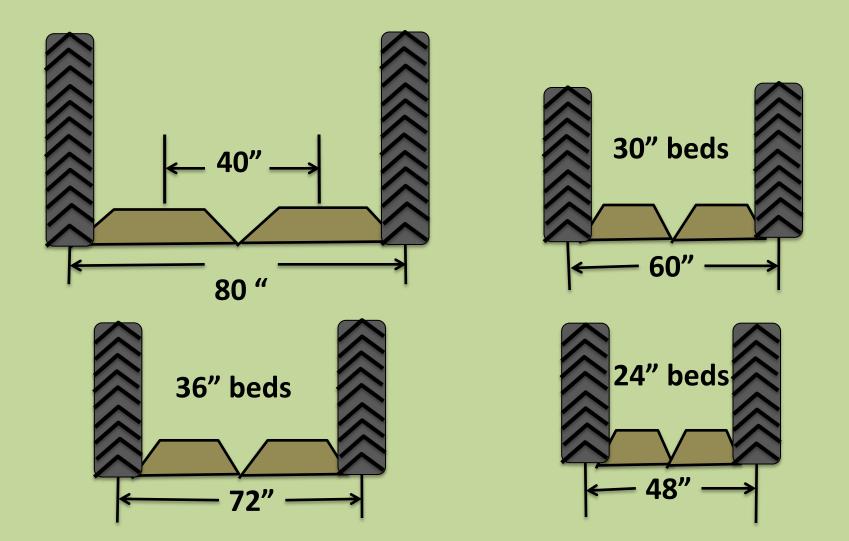
- What is the common spacing used in your region?
- How many acres will you be farming?
- Is your tractor a "row crop" tractor



Row spacing options based on tractor tire spacing (single bed)



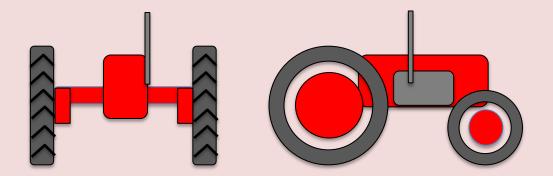
Row spacing options based on tractor tire spacing (double bed)



Tractor configurations:

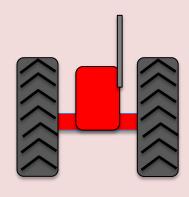
Row crop tractor:

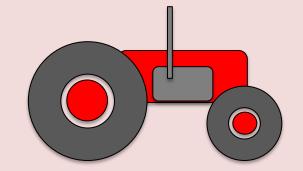
- High clearance
- Adjustable tire spacing
- Tall narrow tires
- Slow gearing
- Good three point hitch



Primary tillage tractor:

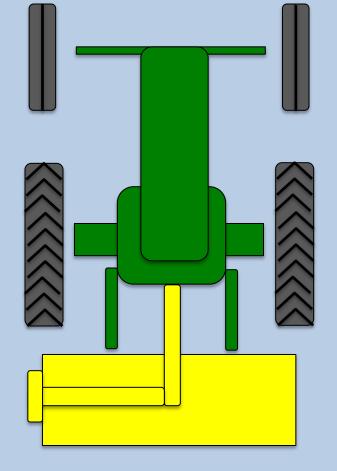
- Wide tires
- Four wheel drive
- High HP
- Lots of weight
- Excellent traction
- Auxillary hydraulics



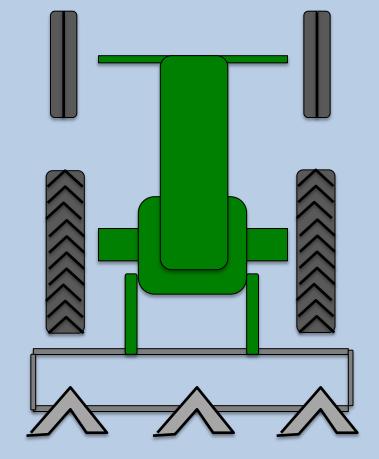




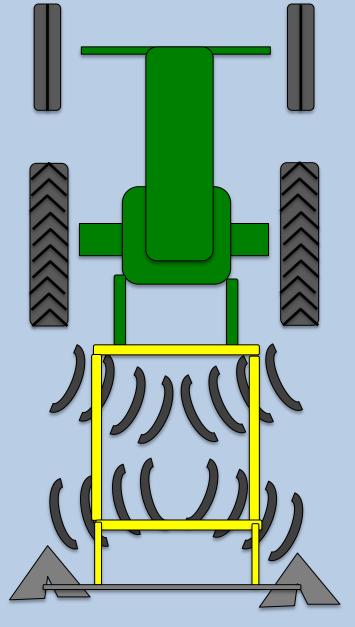
Tractors come in many different configurations and HP ratings the tractor in this photo is referred to as a "Mudder"



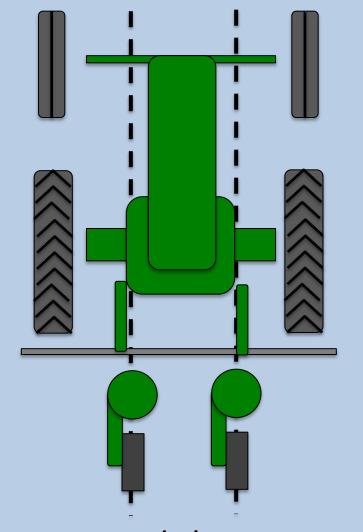
Tillers Mowers Seed drills



Cultivators
Under-cutter bars
Break bottoms
Rolling cultivators

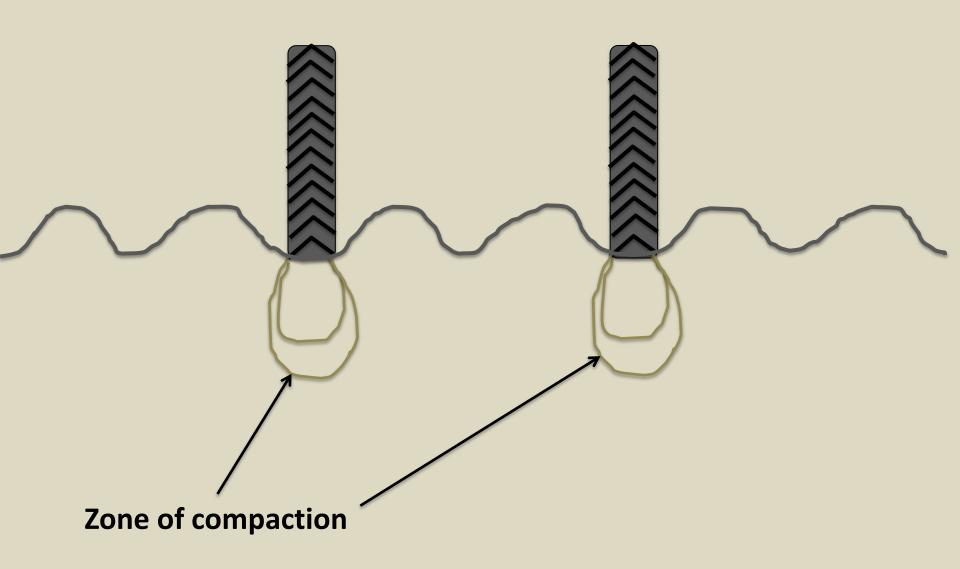


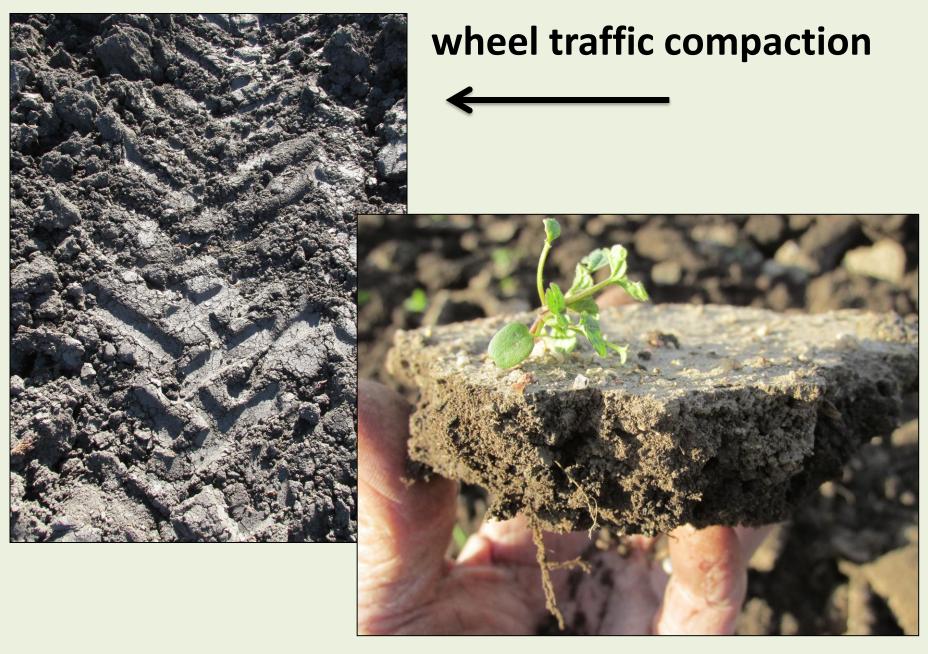
Bedding Discs Bed harrows



Bed shapers
Planters
Drip layers
Mulch layers

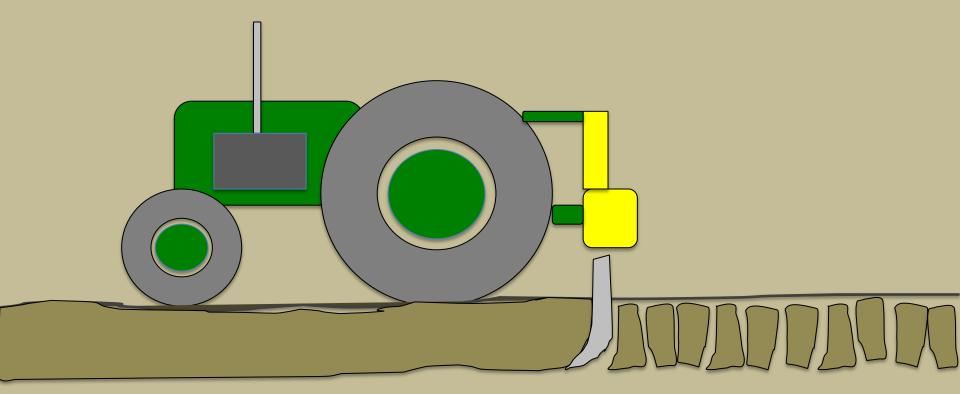
Controlled traffic





soil surface crusting





Primary tillage implements:

- Sub-soilers
- Chisels
- Mechanical spaders
- Off-set discs
- Mold board plows





Mechanical spader



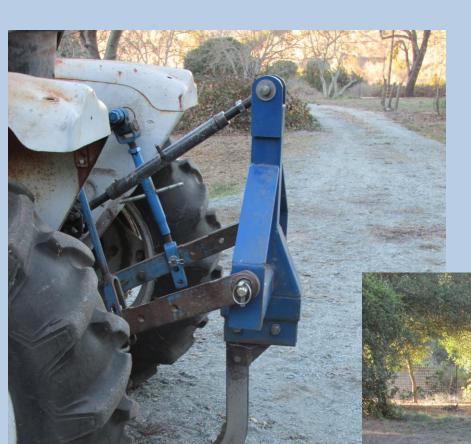
Coil shank chisel

Subsoiling: two shank ripper behind an 80 HP tractor







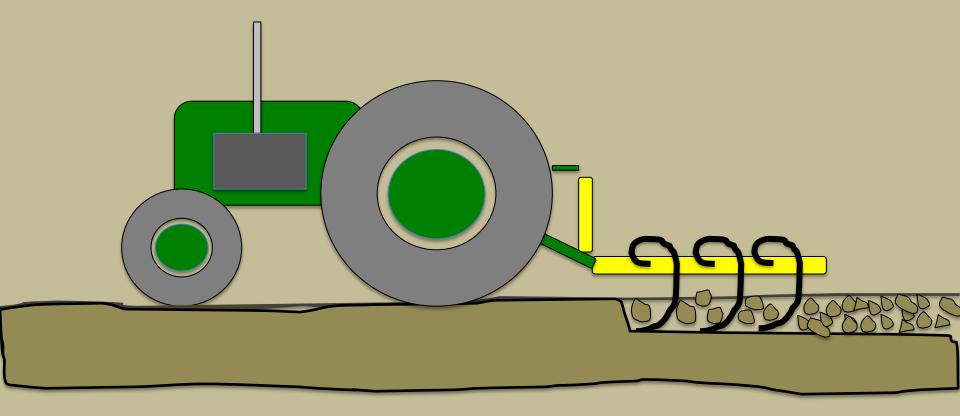


Single shank ripper being pulled by a 25 HP tractor





Discs are perhaps the most commonly used primary tillage implement



Secondary tillage implements:

- Spring tooth cultivators
- Tandem discs
- Rototillers
- Lilliston cultivators



Spring tooth harrow

The three point PTO driven rototiller is probably the most commonly used secondary tillage tool on small farms



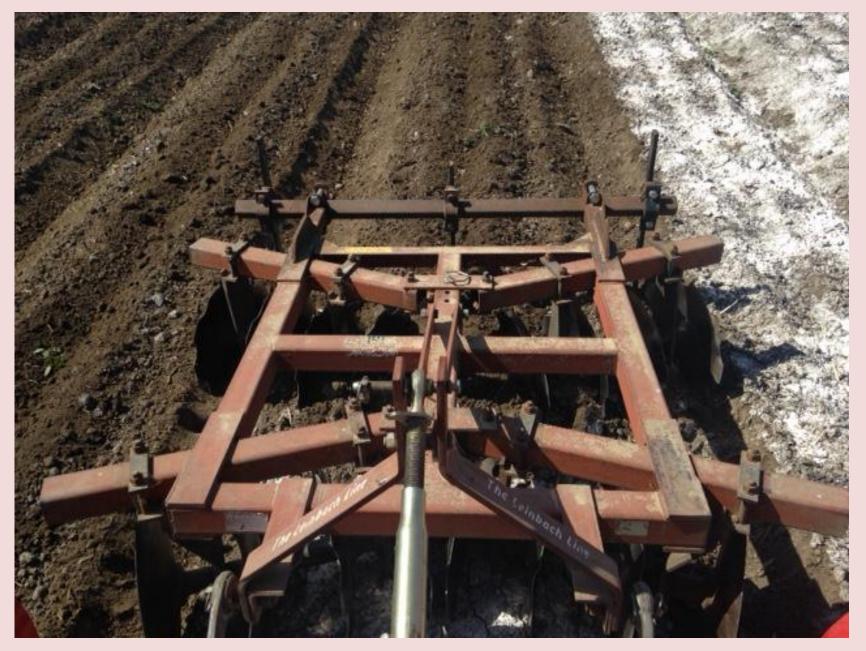


Rototiller

Bedding disc behind a 25 HP Tractor forming 48 inch beds



Bedding disc behind an 80 HP Tractor forming 80 inch beds



Bedding disc incorporating lime



"Perfecta"
Three-in-one
harrow



Rolling Cultivator





Under-cutter followed By spring tines



Bed shapers



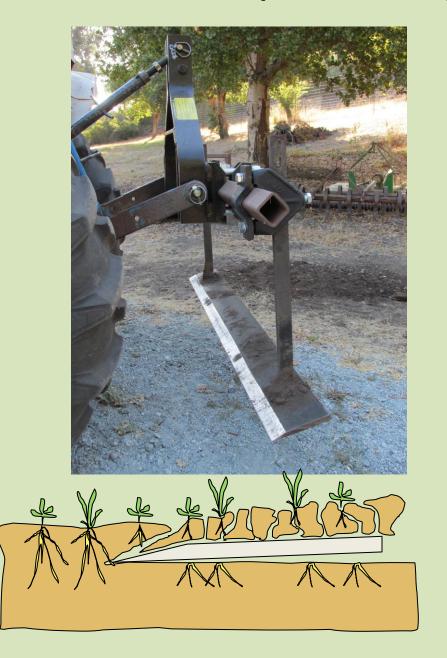


Two row cultivator utilizing sweeps and knives and chisels

Typical "break-bottom"



Under-cutter (weeder bar)





Break-bottom



Flail mower













Mechanical spader







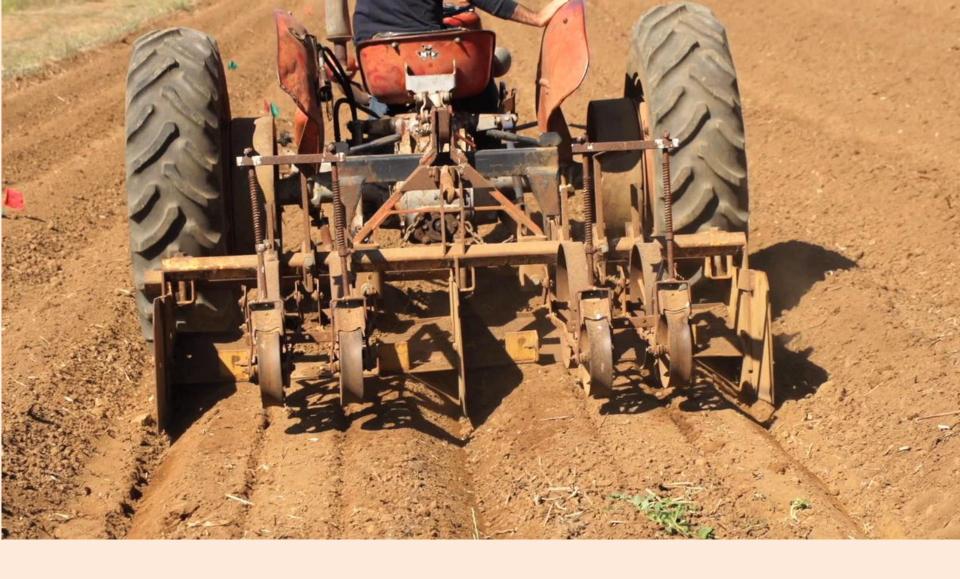


Lilliston Cultivator









Bed shaper



John Deere 71 "large seed" planter



John Deere 33 "small seed" planter



Jang (clean seeder) precision push seeder



Stanhay precision seeders

