Cover Cropping

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Philosophy of Cover Crops

- Plants convert solar energy into organic matter, feeding the soil and soil organisms. Their roots biologically 'till' the soil and help make nutrients and minerals available for the plants as well as beneficial soil micro and macro organisms

- Cover crops are most beneficial when they are used as a mix and allowed to reach full maturity

- Focus on long term health of your soil rather than short term needs of a cash crop

- In nature diversity is the normal condition. Use a cover crop mix with a least one variety of grass, legume and broadleaf represented

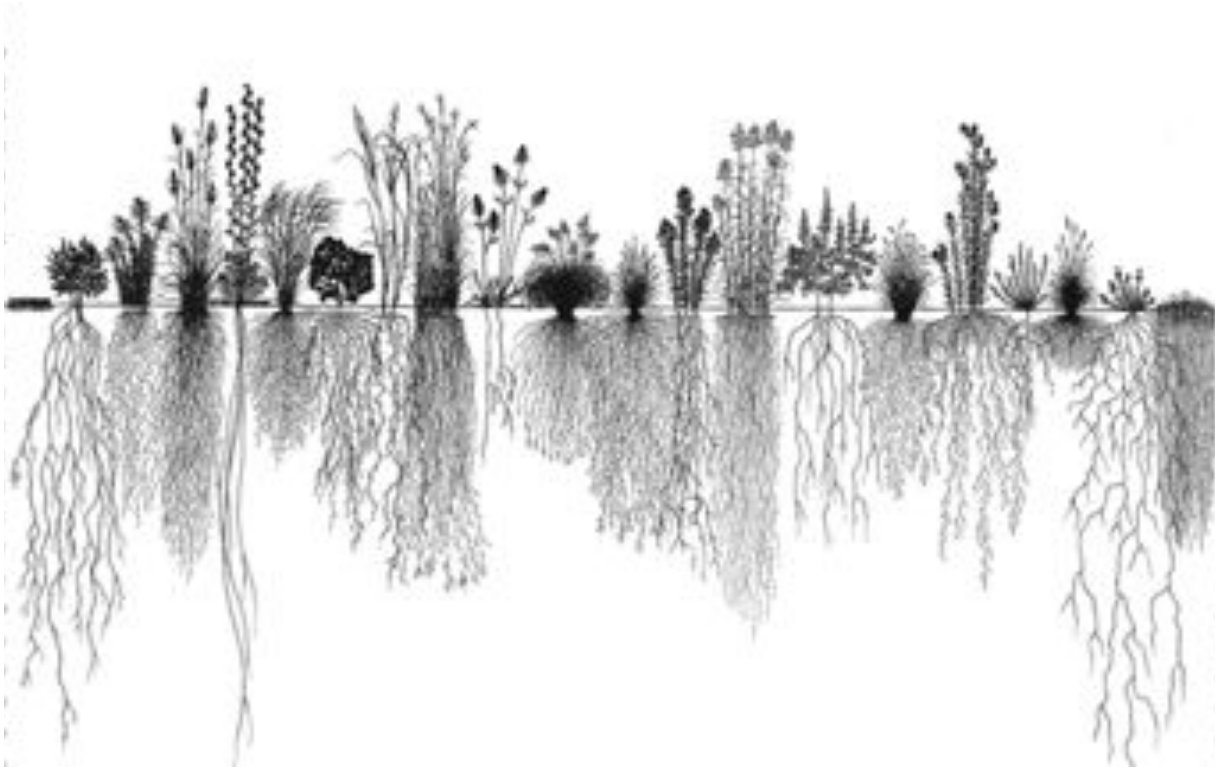
- Avoid bare soil. Cover Crop at every reasonable opportunity

- Year round cover cropping is the most important part of a successful organic no-till system

- Organic mulches and compost are not a substitute for cover crops

Guidelines

- Make mixed cover crops your primary method for creating soil structure, fertility and health
- Any living plant can be used as a cover crop
- All plants add organic matter and increase soil fertility
- The benefits of cover crop roots are of equal, if not more importance than what we observe at the surface



- When possible allow cover crops to reach full maturity prior to termination (in our experience we don't have an issue with cover crops becoming a weed problem)

- Consider establishing permanent cover crops as a living mulch in pathways and non-bed areas

- Consider direct seeding or transplanting into a living mulch (cover crop) as long as it is compatible with the needs of your cash crop
- Only direct experience can help you determine the best cover crop strategy for your operation
- Choose appropriate cover crops for the type of cash crop planned
- Maintain crop rotation considerations

- Making your own cover crop mixes offers more flexibility

- Consider specific needs:

1) Breaking soil compaction
2) Weed suppression
3) Nitrogen availability / fertility
4) Ease of termination
5) Preventing nitrogen leaching
6) Pest and disease management

Cover crops attract beneficial insects

- Take advantage of even short windows of opportunity between cash crops to plant cover crops (need a minimum growing time of six weeks to benefit)

- When direct seeding into a cover crop consider the allelopathic (inhibiting growth) effect of the cover crop
- Cash crops with high nitrogen needs, especially in the spring may need a side dressing of a complete fertilizer, manure or compost, when the nitrogen from the cover crop is less available
- Consideration must be given to the compatibility and growth habits of the cover crop to your cash crop

Seasonal Mixes

Suggested cover crop mixes

Fall Mix

Grasses: rye, oats, barley, tritcale

Legumes: mixed vetches, mixed clovers, winter peas and fava beans

Broad leafs: oil seed radish, turnips, phalceia, mustard, rape

Spring Mix

Grasses: oats, barley, wheat

Legumes: field peas, vetch, red clover, crimson clover, New Zealand and sweet clover, cow peas

Broad leafs: flax, buckwheat, mustards, radish, phacelia, chicory, turnips, sunflowers

Summer mix

Grasses: millet, oats, sudangrass

Legumes: soy beans, cow peas, red clover, bush green beans

Broad leaf: buckwheat, turnips, rape, oil seed radish

Broadcasting cover crop seeds

- With the exception of large and expensive seeds (peas and fava beans), we generally broadcast at a significantly higher rate (50%) than suggested when using a planter or seed drill
- With very small seeds, such as clovers you may want to mix them with soil and compost
- When possible cover with some plant residue or scratch into top soil with a rake
- To increase germination rate make sure there is adequate moisture in the soil

Incorporation into Soil

Downside of tilling in green manure

- In no-till farming green manures (immature cover crops) are not incorporated into the soil through tillage

- Although there is a short term benefit to incorporation of a green manure into the soil (low Carbon to Nitrogen ratio below 30/1) we seldom acknowledge the negative effects

1) rapid decline in nitrogen levels
2) stimulates weeds
3) reduced biomass of cover crop
4) reduced root function of cover crop
5) reduced weed suppression
6) reduced organic matter
7) increase in soil compaction
8) reduced water absorption and retention
9) increased erosion
10) reduced soil aggregate
11) damages soil structure

- With some equipment green manures can be incorporated into the top two inches of the soil without the negative consequence of deep tilling

- Major challenge of no-till cover crops is incorporation into the soil

- Consider what is going on beneath the soil as well as above

- Frequent mowing of cover crops prior to planting will weaken them

- No need to move cover crop residue to a central location

- Termination of cover crop & handling of residue will depend on the type of crop you are planting as well as if it is direct seeded or transplanted and purpose of cover crop

- You need to consider equipment available
- For maximum weed suppression prior to planting you need to have a thickly planted cover crop with no bare ground exposed

- As a weed suppression mulch you need to have a heavy biomass (4-6 feet)

- Leave residue on surface and plant into residue

Good for transplants and crops such as squash, cucumbers, pole beans

- For small seeds requiring a finely groomed seed bed: Remove residue and compost it.

Compensate for loss of residue with compost from the previous season

Experiment: 2 cover crop treatments in both tilled & no-till beds

1. none - salad green crop left

2. fava beans

- Favas planted in October, following removal of salad greens

Experiment: Soil raked over to cover seeds. Salad green residue placed back on bed & used as a mulch. Also helps prevent birds eating seeds!

Removal of mature fava beans in June, prior to sowing carrot seed

Easy to pull by hand, produces a lot of bio-mass but not good for controlling grasses. Would have been better as part of a mix with clovers & vetches