



Equipment for Tillage Reduction at Sawyer Farm

About the Farm

- Cold, rocky, poorly drained
- Sloped
- Five acres vegetables, mostly low-value storage crops



About the Farm

- Low overhead — no mortgage, few employees
- Sales: 1/3 farmstore, 1/3 hemp/CBD, 1/3 wholesale veg
- No farmer neighbors...no embarrassment



We've Tried Five Tillage-Reduction Systems

- Crimped Rye
- Winter-killed Cocktails
- Transferred Mulch aka Pastured Vegetables
- Tarped Bed System
- Perennial Dutch White Clover Living Mulch

Perennial Clover Living Mulch

Establishing Dutch White Clover

- Dutch White clover is an amazing cover crop — low-growing, overwinters, but easy to terminate
- Undersow into cash crops throughout July at last cultivation



Perennial Clover Ground Cover

Establishment Equipment

- We use a chest seeder and broadcast at a rate of 30-45 pounds per acre. (Undersown, not incorporated, in dry July..., these rates ensure good stand.)
- That works at our scale, but I'm interested in equipment ideas for undersowing into cash crops or broadcasting into rye in spring.



Perennial Clover Living Mulch

**Spring after Establishment
(Year 2 Clover)**

**For years, we disced it in at
this stage, then grew in bare
soil**

**Now we leave this clover intact
and transplant/seed into it.**



Perennial Clover Living Mulch

Believe it or not, it works!

Delicata squash
transplanted 6/2



Delicata, 6/18



Delicata, 7/8 - after mowing



Delicata, 7/22



Delicata, 8/17



Perennial Clover Living Mulch



Transplanting Cabbage 6/16

Cabbage Transplanting 6/16



Cabbage 7/1



Cabbage 7/27



Cabbage 9/25

- **Irrigated cabbage fertilized at 90# N/acre yielded 30,000 lbs./acre with 98% marketable heads**



Broccoli



Tomatoes



Direct-Seeded Beans



Perennial Clover Living Mulch

Upsides

Easy Management

- Reminds me of 'regular' growing, just leave clover
- Easy to bail out in spring
- Tillage every 4-5 years to renew clover stand (Tillage year is an opportunity to grow carrots, onions, etc.)

Ecosystem Services

- Ecosystem services: provides habitat, fixes C and N, living roots 365 days/year, SOM
- Labor and fuel savings (3 tractor passes - mowing, transplanting, brush hogging)

Labor Savings

- Lawnmower instead of hoe, no row cover

Perennial Clover Living Mulch

Downsides

- Clover competition and soil shading - doesn't work for some crops (see pepper photo from 7/27)
- Reduces yields on some crops
- Requires some equipment modification/investment to scale



Perennial Clover Living Mulch

Equipment

- **Hay mower and brushhog, or flail mower** (pre-plant mowing and post-harvest mowing)
- **Transplanter** with no-till modifications (or **bulb auger** at small scales)
- **No-till planter** (or coulter and ripper with push seeder) — optional
- **Lawnmower/Weedwhacker** or Row-Mower (mowing during season)

Ibex Drum Mower



Can handle stones and debris...
nice but not necessary



Perennial Clover Living Mulch

Transplanter



Issues

- **Coulter/
ripper
combo**
- **Furrow
closure**
- **Furrow
disturbance**

Mechanical Transplanter's No-Till Attachment

Row cleaners make a mess

2" wavy Coulter is too aggressive

Ripper tooth doesn't run deep enough

All spaced too close together — residue clogging



Homemade Coulter/Ripper

Straight Coulter

Ripper runs up to 7" deep



Need removable weights to close furrow.

Why removable? Added weight crushes transplants in tilled ground.

Added 2.5" square tube to support weight bracket for stone

Added Weight Set ~250# to packing wheels

Added ~120# weight set to counterweight drivewheel

Weights slide over welded gas pipe. Collar with set screw holds weights on.





Furrow disturbance = weeds in the furrow





LIFTS, DOESN'T SHOVE!

So many questions still!

- Which crops are economical?
- Which varieties work best?
- What are the moisture dynamics?
- What effect does soil type have?
- So many trials to run!

Interested in Perennial Clover?

Get in touch...

- We're starting a non-profit that provides payments for implementation and crop insurance on trial acreages and we're looking for farmers to run trials.
- We're hiring for a position to gather data and do fieldwork for a 2023 SARE grant to do side-by-side trials on yield and labor.
- Email pcsfarmpartner@gmail.com