

COVER CROP-BASED PRODUCTION OF VEGETABLE CROPS

*Dr. Ron Morse, Virginia Tech
Horticulture Department*





COVER CROPS FOR SOIL HEALTH

RECOMMENDATION: GROWERS SHOULD CONSIDER OFF-SEASON PRODUCTION OF COVER CROPS OF EQUAL IMPORTANCE AS IN-SEASON PRODUCTION OF CASH CROPS (vegetable, flower and small fruit crops).

SOIL HEALTH DEFINED

“Soil’s capacity to consistently produce high crop yields, using few off-farm inputs, with little or no harm to the environment.”

MAINTAINING SOIL HEALTH

- SOIL HEALTH is dynamic; it can be managed.
- SOIL HEALTH declines during production of cash crops.
- SOIL HEALTH is restored when cover crops are produced during the off-season.





ROLE OF CONSERVATION AGRICULTURE (CA)

CA is a philosophy, with specific objectives and practices, designed to sustain and promote soil health.

COVER CROPPING IS PART OF ALL THREE OBJECTIVES OF CONSERVATION AGRICULTURE:

- *Minimize* soil disturbance (reduced tillage)
- Maximize year-round soil coverage
- Maximize farm and field plant diversity

METHODS OF ESTABLISHING COVER CROPS

Seed drills function best to distribute different sole or mix (cocktail) of cover crops in ADJACENT ZONES of field beds.



GROW ZONES AND TRAFFIC ZONES DEFINED

GROW ZONES: space (2-4 ft wide), where legume cover crops and succeeding cash crops are grown.

TRAFFIC ZONE: space (2-3 ft wide), between grow zones, where grass cover crops are grown and retained as a living or dead mulch.





COVER CROP-CASH CROP SEQUENCES

IN GROW ZONES:

- Legume-based cover crops are grown.
- Cover crops are killed and managed.
- Cash crops planted in NT or ZT systems.

SELECTING THE BEST COVER CROPS

- No two cover crops are alike.
- Long-term planning is important to grow the best cover crops for each type of cash crop (spring, summer or fall).

SELECTING THE BEST COVER CROPS

SPRING VEGETABLES: Onion, Pea, Irish potato

WINTER-KILLED summer cover crops are best:

Examples: Berseem Clover & Spring Oats, Forage Radish & Spring Oats—seeded in July or August of the previous year.





SELECTING THE BEST COVER CROPS

SUMMER VEGETABLES: Tomato, Pumpkin

WINTER cover crops are *best*.

Examples: Crimson Clover & Barley, Hairy Vetch & Rye,
Austrian WP & Triticale—seeded in Sept/Oct of the
previous year.







SELECTING THE BEST COVER CROPS

FALL VEGETABLES: Cabbage, Broccoli

SUMMER cover crops are *best*.

Examples: Cowpea & Foxtail Millet, Sunn Hemp & Sorghum-Sudangrass—seeded in May or June of the current year.











COVER CROP-CASH CROP SEQUENCES

Wide Zone-Till is Recommended, Because:

- **Zone-till equipment is available and affordable.**
- **Likelihood of success is high, especially if plastic mulch is used to cover the tilled grow zones.**
- **Living or dead grass-based cover crop mulch is grown and retained in traffic zones.**







MAKING NO-TILL WORK ON SMALL FARMS

FOUR STEPS TO SUCCESS:

ONE: Produce uniform, high-residue cover crops (3 or more tons/acre).

TWO: Kill cover crops, leaving a uniform, dense mulch.

THREE: Establish cash crops by hand, or use no-till transplanters or seeders.

FOUR: Manage weeds, using high-residue mulch, and/or herbicides.