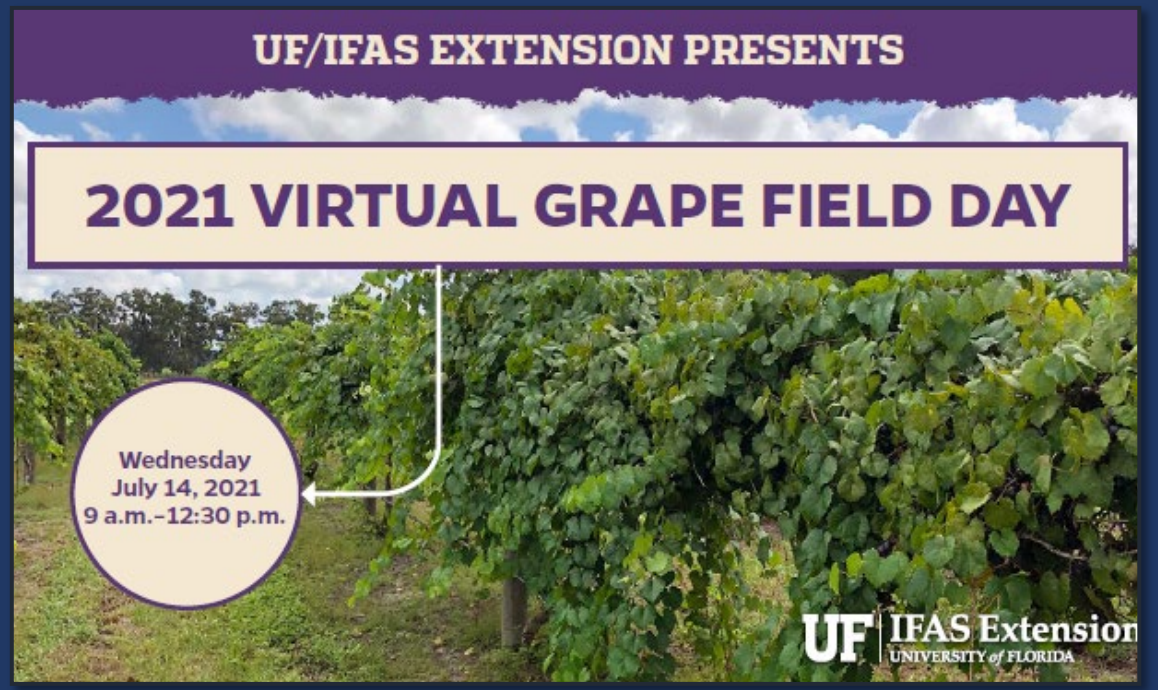

Cover Crops and Organic Certification as Alternative Strategies for Vineyard Management

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UF IFAS UNIVERSITY of FLORIDA

IFAS PHOTO:
Faculty in Vineyard
Early 1900's

Success of alternative systems depends largely on soil management. If you manage for optimum soil physical, biological and chemical quality, you are managing for Soil Health!

Soil Health is:

the continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals, and humans.

Part 1. Cover Crops

National Cover Crop Initiative

20 Million Acres in Cover Crops by 2020

- Improved access to technical support and equipment
- Recognizing innovative farmers
- Develop educational materials and consistent messaging
- Increase research
- Align program requirements among farmer agencies (NRCS, RMA, etc.)

Adding Cover Crops to Your System

1. Choose your primary objective.

Adding Cover Crops to Your System

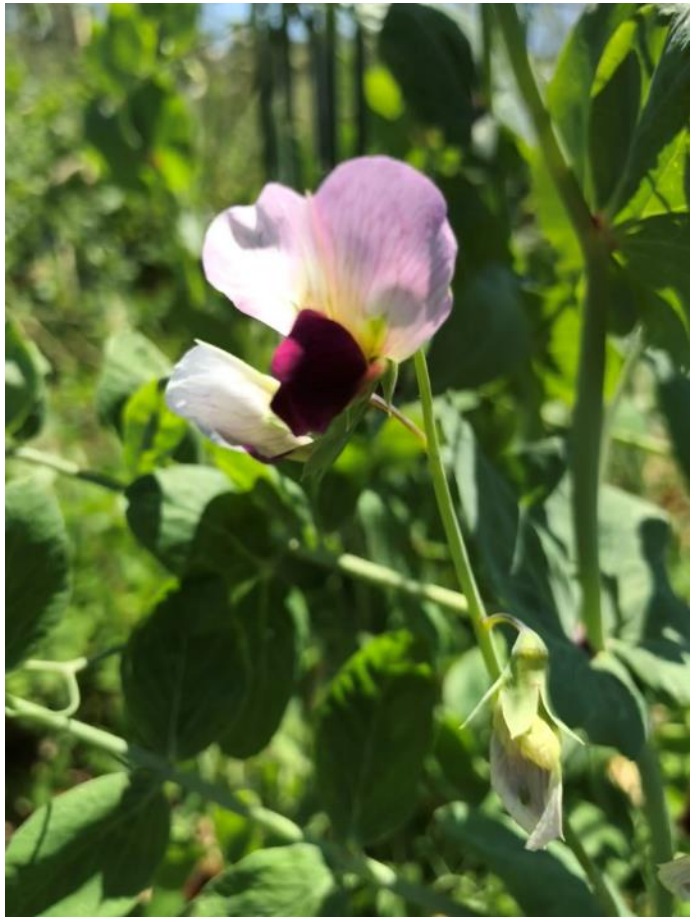
2. Consider your seeding and termination equipment.

Adding Cover Crops to Your System

3. To meet your objective, what time of the season will you plant? When will covers help grape systems the most?

Adding Cover Crops to Your System

4. Create a short list of cover crop species

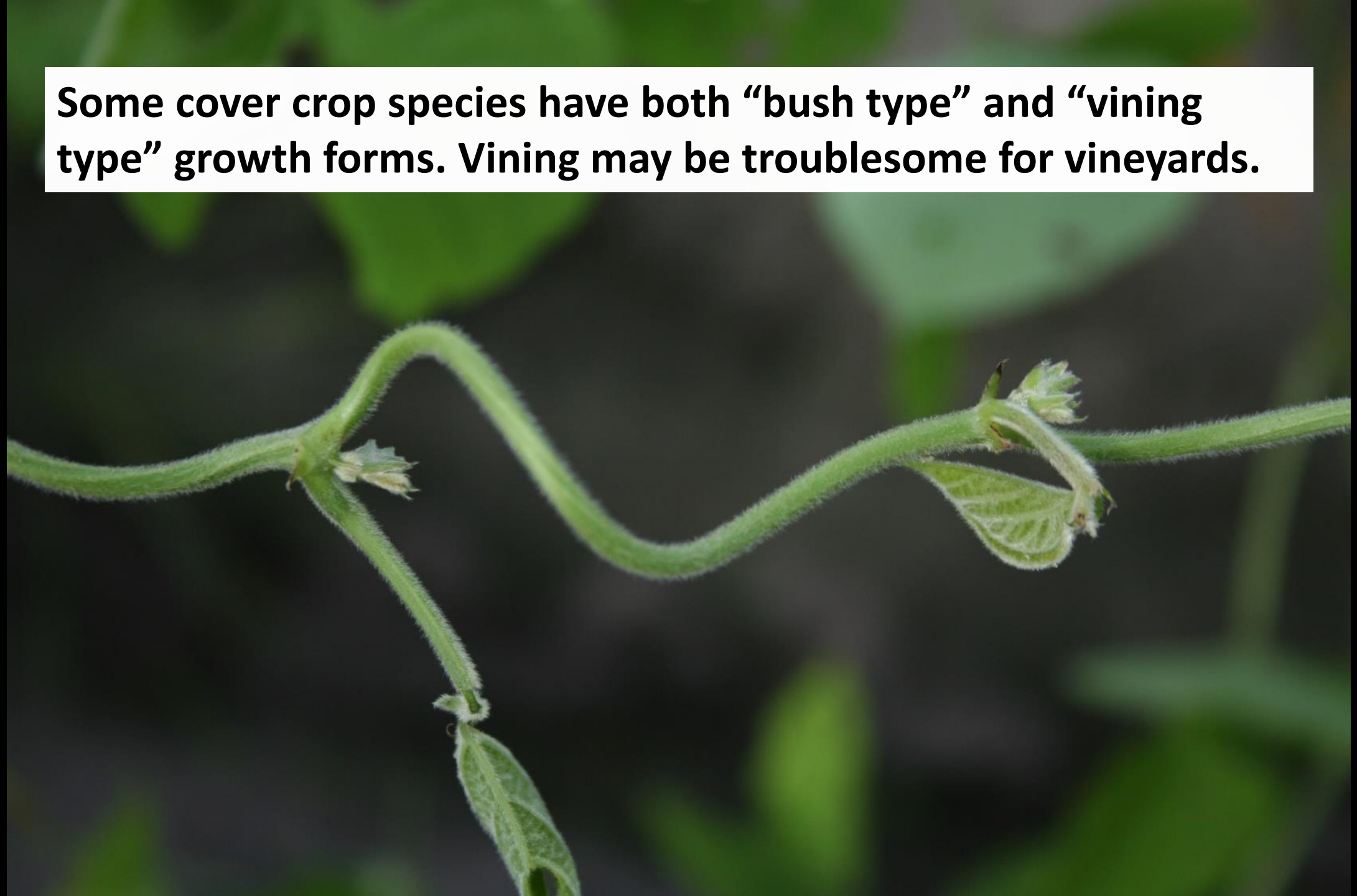


Warm Season Cover Crops

COMMON NAME	LATIN NAME	CULTIVARS
Sunn hemp	*Crotalaria juncea*	'AU Golden'
Cowpea	*Vigna unguiculata*	'Iron Clay'
Lablab	*Lablab pupureus*	*unnamed*
Pearl millet	*Pennisetum glaucum*	'Tiff' series
Sorghum Sudangrass	S. *bicolor* x *S. sudanense*	Various lines
Buckwheat	*Fagopyrum esculentum*	'Manor'
Sesame	*Sesamum indicum*	Various lines
Sunflower	*Helianthus annuus*	'Mammoth'

Cool Season Cover Crops

COMMON NAME	LATIN NAME	CULTIVARS
Crimson clover	*Trifolium incarnatum*	‘Dixie’
Alyce clover	*Alysicarpus ovalifolius*	
Austrian winter pea	*Pisum sativum spp. Arvense*	‘Frost’
Daikon radish	*Raphanus sativus*	
Triticale	*Triticum aestivum X triticosacale*	
Cereal rye	*Secale cereale*	‘FL 401’ ‘Wrens Abruzzi’



Some cover crop species have both “bush type” and “vining type” growth forms. Vining may be troublesome for vineyards.

Daikon radish does an excellent job of reducing soil compaction, but roots make foot traffic difficult.

Beginning cover croppers should begin with a single species, then increase to multi-species blends with experience.

Cover Crop Establishment

Sesame

- Time and labor required for planting and establishment is a primary barrier to adoption.
- In organic systems, seed should be labeled organic, or untreated.
- Legumes should be inoculated with the recommended species for the legume “type” (pea, vetch, bean)

Cover Crop Establishment

Buckwheat

- Fertilizer and irrigation to establishment are necessary. Typically, nitrogen rate = 40 lbs/a. Plant ahead of rain for good establishment.
- If cover crop establishment fails, be prepared to implement a Plan B.
- Use seasonal temperature changes to your advantage (frost kill)
- Scout your covers as you would your crop.

Terminating Cover Crops

Sunn hemp after crimping

MOW. Flail mowers deposit material directly under the deck; rotary mowers (Bush Hog) throw plant material unevenly outside of deck. Can leave on the surface or incorporate.

SOIL INCORPORATE. May be difficult with a lot of residue. May require several passes.

ROLL/CRIMP. Equipment highly customizable. Regrowth is possible if plants are not fully terminated. Timing of termination VIP.

Mowing Cover Crops

- Orchard mowers will likely not be able to manage the amount of biomass generated by covers, and mow too low to maintain a healthy cover crop.

Sunn hemp is excellent for weed and nematode suppression. It was developed to be used for fiber. Mowing when mature is not recommended.

One pass set-up to reduce fuel and labor. Front mounted roller crimper, followed by a high residue (no-till) seed drill.

Roller crimped winter annual rye *Secale cereale* L. ‘FL401’.

Disrupts vascular system

Suggestion for Cover Crops in FL Vineyards

October-January: Dormancy

January-March: Pruning

February: Break dormancy, leaves emerge

March-April: Vegetative growth begins, fertilize grapes

- **TERMINATE COVERS.** Decomposing cover crops will provide a nitrogen boost to neighboring vines but also weeds. Consider an herbicide application after termination. Cover crop residue on the surface will help suppress weeds.

May-July: Fruit matures

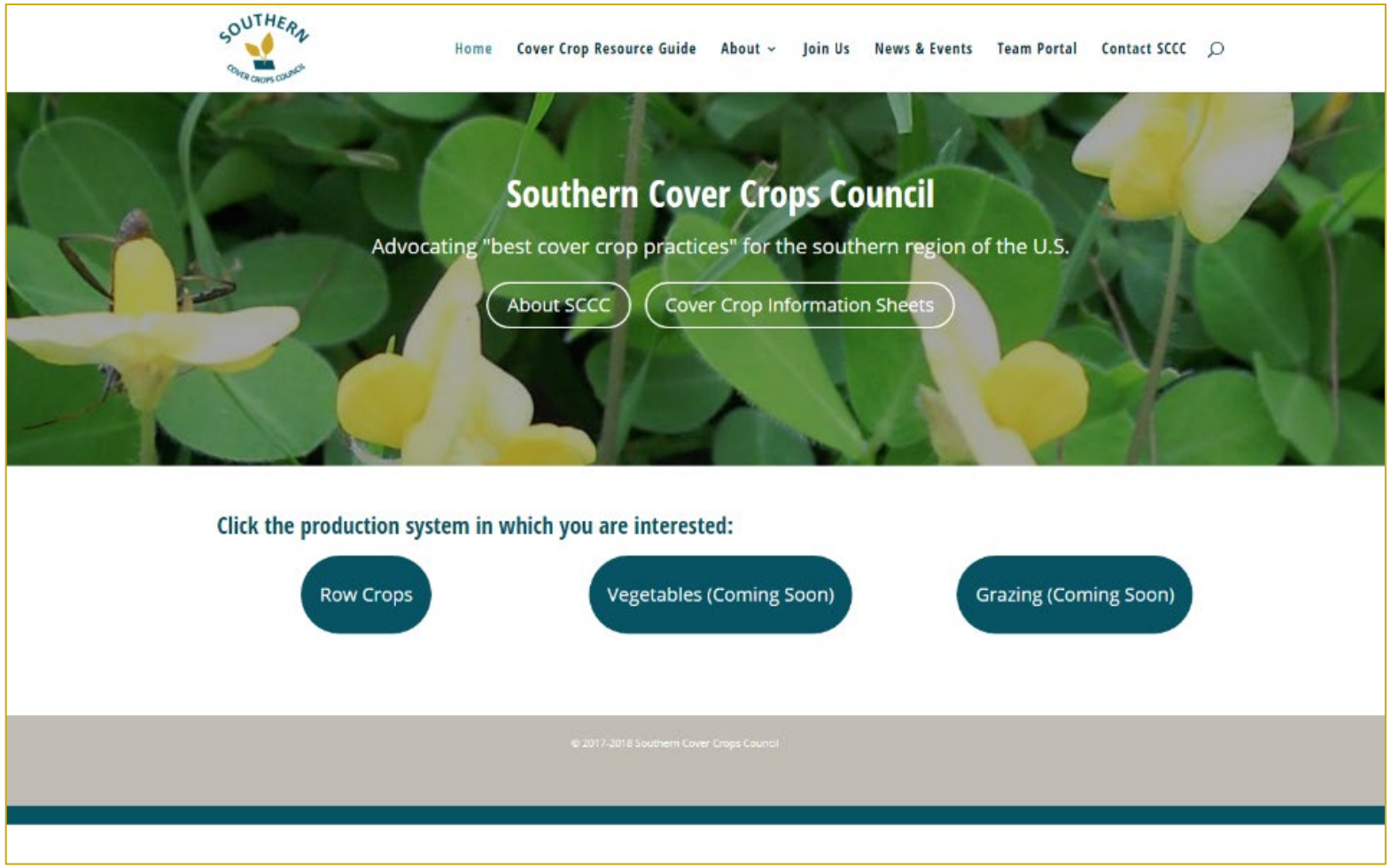
June: Fertilize grapes

August-September: Fertilize grapes (in August) and harvest

- **PLANT COVERS**. Once harvest is done or nearly done, prepare soil for cover crop planting. Soil test in alleys and add fertility if needed. Seed in alleys ahead of precipitation (1-2" rain best). Seed at least 2-3 weeks ahead of a hard freeze, particularly if seeding legumes. If seeding for the first time, cultivate to reduce compaction, add compost if possible, and drill seed. If seeding into native vegetation, mow before using a no-till drill. If no-till, consider perennial or annually re-seeding cover crop species. It is possible to get to two crops of covers before a hard freeze (warm season then cool season species).

https://www.wineaustralia.com/growing-making/vineyard-management/cover-crops

www.southerncovercrops.org



- Cover Crop Information Sheets
- Cover Crop Selection Tool
- Managing Covers
- Seed Sources
- Equipment
- Local Experts

Part 2. USDA Certified Organic

USDA's National Organic Program

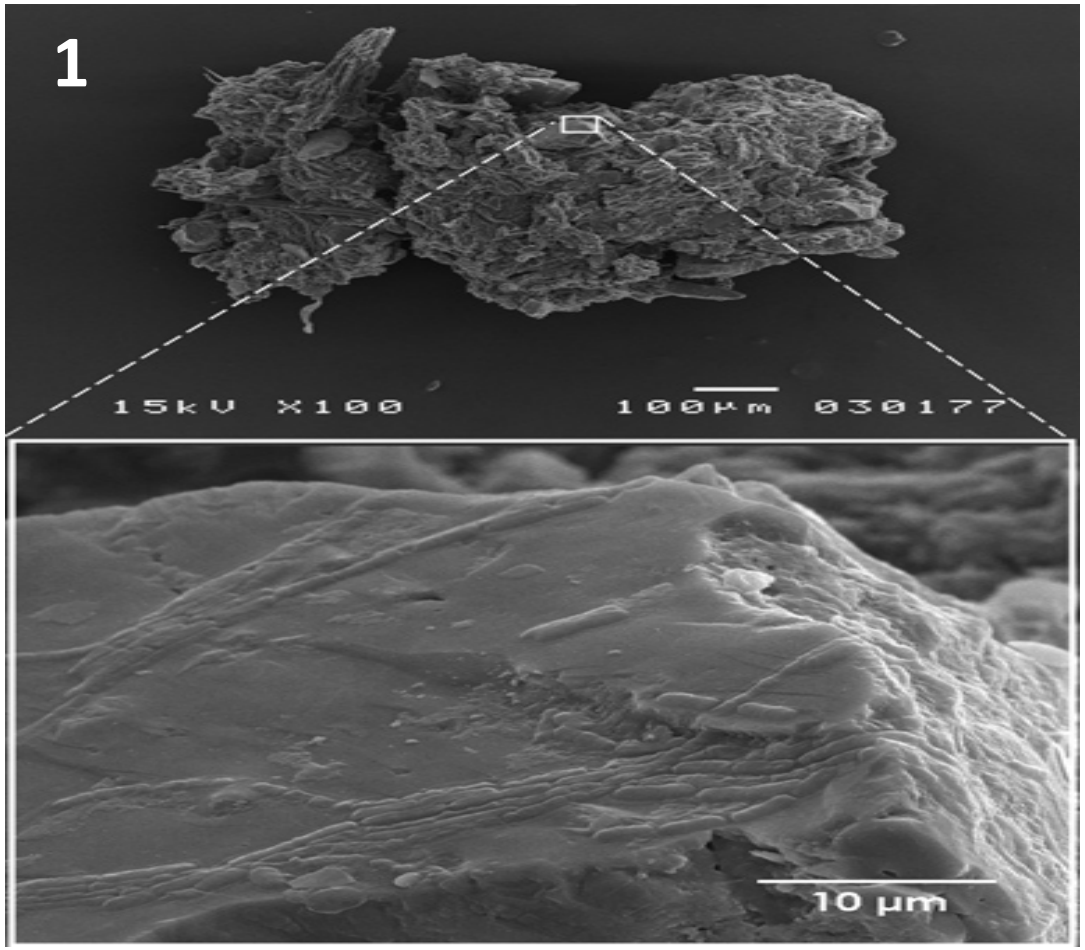
- Certified Organic farming systems are the ONLY farming systems in the United States that
  - are REQUIRED by federal regulation to use an integrated package of management practices that maintain or improve the natural resources of the farm, including soil and water quality,
  - are REQUIRED to use preventative management practices to manage pests, and
  - are REQUIRED to undergo a rigorous annual oversight and certification process.

Organic management improves soil quality,

Soil in poor condition
from Isabella, Puerto Rico.

- Organic farming is based on the principle that adding organic matter to soil improves system function, crop quality, yield, and profit.
- Organic matter (OM) can be defined as the living, the dead and the very dead components of the soil.
- OM supports life in the soil, helps retain nutrients and water.
- In general, every 1% increase in OM helps soil hold 20,000+ gallons more water per acre.

fosters biological diversity,



1. Muruganandum, 2005

3. Roy A. Norton, State University of NY

and has positive impacts on local economies.

Jalapeño peppers.

- 60% of organic businesses reported increasing the number of full-time employees
- Income for organic farmers has nearly doubled in the past five years
- Organic farmers are six years younger on average than other farmers (51 vs 57).
- Organic food sales have increased every year since 2010 and now comprise 5.8% of the total market

- Organic Trade Association, 2019

The Process of USDA Organic Certification

1. Choose Any Accredited Certifier


MOSA

PO Box 821, Viroqua, WI, 54665 Ph:(608) 637-2526 Fax:(608) 637-7002 mosa@mosaorganic.org www.mosaorganic.org

Farm: Update Organic System Plan Long Form

Use this form to provide an updated description of your operation. If some sections do not apply to you, check the "none" or "not applicable" boxes. A new Crop Input Inventory must be submitted with this Long Form listing ALL crop products in use on your farm. Contact MOSA with questions.

SECTION 1: General Information

Primary Account Name	Date	For Office Use	Rec'd	Initials
First Name	Last Name	Official	Grid #	Cert	Insp	Other
Other names associated with account		Farm Address		
First Name(s)	Last Name(s)	City	State	Zip	County
		Mailing Address, if different		
		City	State	Zip	
Farm Name	Name(s) for certificate: ☐ primary name only ☐ all of the above	Phone Information		Do not publish
Email	Website	Home		☐
MOSA will communicate by email with your approval. Indicate what you can receive by email.		Cell		☐
☐ annual update forms ☐ certification letters ☐ organic certificate		Fax		☐
☐ general communications ☐ newsletters ☐ financial communications		Other		☐

Check if you want to receive Organic Materials Review Institute (OMRI) materials: ☐ Yes, I find OMRI materials useful and want to receive them by ☐ email ☐ postal mail I would like to receive: ☐ Generic Materials List ☐ Products List ☐ both

Are you requesting certification this year for anything that is not listed on your current certificate?
☐ nothing new this year
☐ new product, crop or livestock (specify): _____ Sales planned for _____ (date) ☐ no sales planned
☐ new land this year. *Submit a map and a 3 year field history. A Prior Land Use Declaration will need to be submitted if land was under someone else's management during the last 36 months.*

If you are requesting certification for any of the following, the Organic System Plan for that type of production will need to be submitted along with this Plan. Indicate which categories apply.
☐ Livestock or Livestock Products (dairy, meat, eggs, wool) ☐ Greenhouse ☐ Maple Syrup ☐ Mushrooms ☐ Wild Crops
☐ Sprouts ☐ Hydroponics ☐ Processed Farm Products (specify): _____

Are you currently certified by another agency? ☐ No ☐ Yes Which agency? _____
Attach a copy of your last certification letter and certificate from that agency.
Do you intend to certify with another agency this year? ☐ No ☐ Yes Which agency? _____
Identify all programs for which you are requesting certification and/or verification:
☐ NOP organic certification ☐ verification of organic transition (such as for EQIP program)
☐ EC/EU verification (additional form required) ☐ JAS equivalency

Do you understand the requirements for this program and MOSA's fee structure for such certification or verification?
☐ Yes ☐ No Explain:

Give directions to your farm. Include a map if needed.

Preferred contact time: ☐ morning ☐ afternoon ☐ evening
Preferred contact method: ☐ phone ☐ postal mail ☐ email Preferred inspection time: ☐ morning ☐ afternoon ☐ evening

Effective Date: 1.14.10

Page 1 of 12

2. Develop Organic System Plan (soil and pests)

3. Work with Inspector to Ensure Plan is Compliant


Certificate of Compliance

Certified Organic

Number 186483-A

Certified Entity: Alvita Medicinals, Inc. 2300 Arrowhead Dr Carson City, NV 89706 USA

Type of Operation: Handler (Processor)

Location Inspected: Alvita Medicinals, Inc. 2300 Arrowhead Dr Carson City, NV 89706 USA

Effective Date: April 14, 2008

Quality Assurance International, upon providing this certification, states that it has reviewed the Certified Entity's application, reviewed its records, inspected its fields and/or facilities, and has determined that the certified entity identified above is operating in accordance with the Organic Foods Production Act of 1990 and 7 CFR Part 205. To the acceptance of this certification, the certified entity warrants that it is in, and will remain in, full compliance with the Terms and Conditions of the Certification Agent, and in accordance with general guidelines established by the USDA's National Organic Program.

Certification valid until terminated, suspended or revoked.

QUALITY ASSURANCE INTERNATIONAL

4. Inspector Submits Plan for Approval. Once Approved, Products Labeled with Organic Seal.

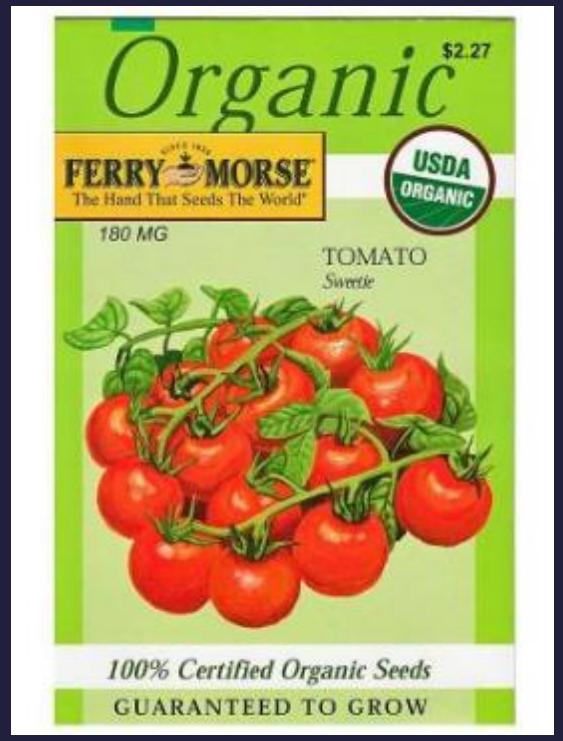
Systems are Certified

Products Bear Organic Labels

USDA ORGANIC

OMRI™
Listed
www.omri.org

Inputs
Are Approved for Use



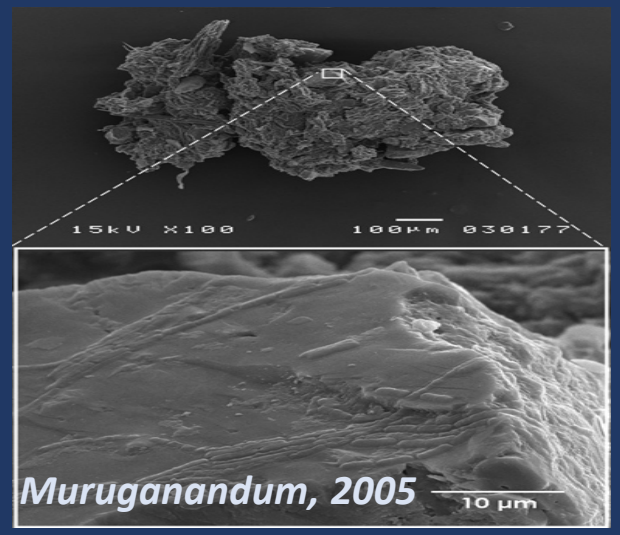
Use Approved Inputs: Seed and Stock.

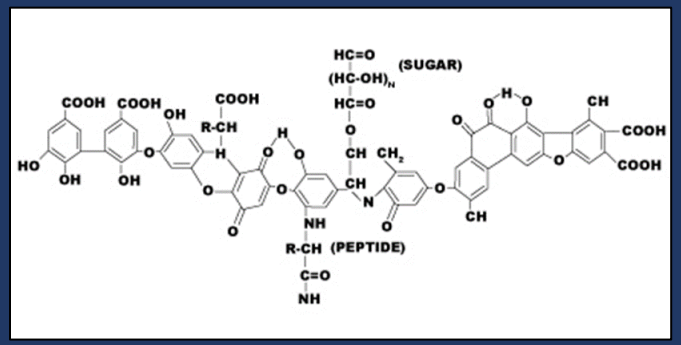
- Only use inputs approved in your system plan or approved “on the fly” from your certifier.
- The USDA NOP website only publishes approved *ingredients*.
- Approved *products* (specified by function – fertility, sanitation, etc.) can be found on the OMRI website (non-profit, not affiliated with the USDA but trusted by the industry).
- Seeds, including cover crop seed, must be organic unless not available. Untreated seed can be approved with documentation.
- Seed stock must be organic, but conventional stock can be used under some circumstances with approval from your certifier. If conventional, plants must be in certified land for 12 months before harvest, then they can be sold with the organic label.

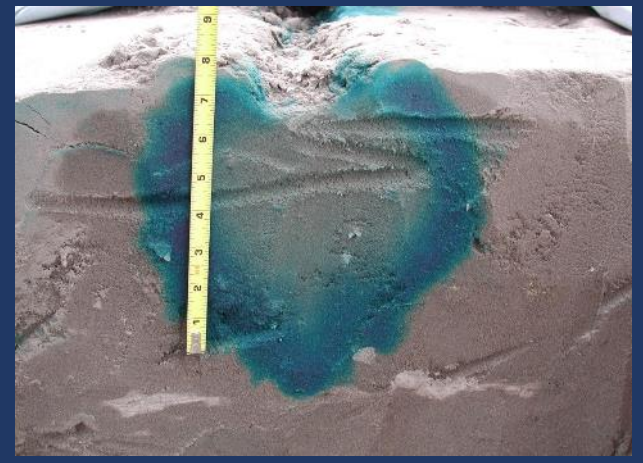
Use Approved Inputs: Growing Media & Pot Systems.

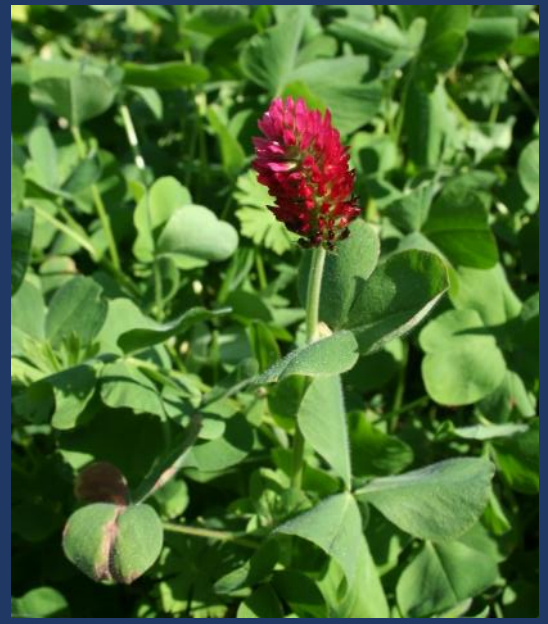
- Commercial media may have synthetic fertilizer and wetting agents (often petroleum-based); don't be misled by the term "organic" on the label. Verify products are approved for use. Approved media may have:
  - Natural wetting agents include yucca (saponins) and polysaccharides
  - Soil conditioners include fulvic acid and seaweed extract
  - Starter nutrients include nitrogen sourced from animal by-products, mined potassium, micronutrients (some synthetic micros are allowed)
- The land (i.e., the soil) under pots must be certified, even if the plants are in pots, in media, on landscape fabric, etc.

What do we need to know for N management?









Selecting Fertilizer Form

Dry Granular

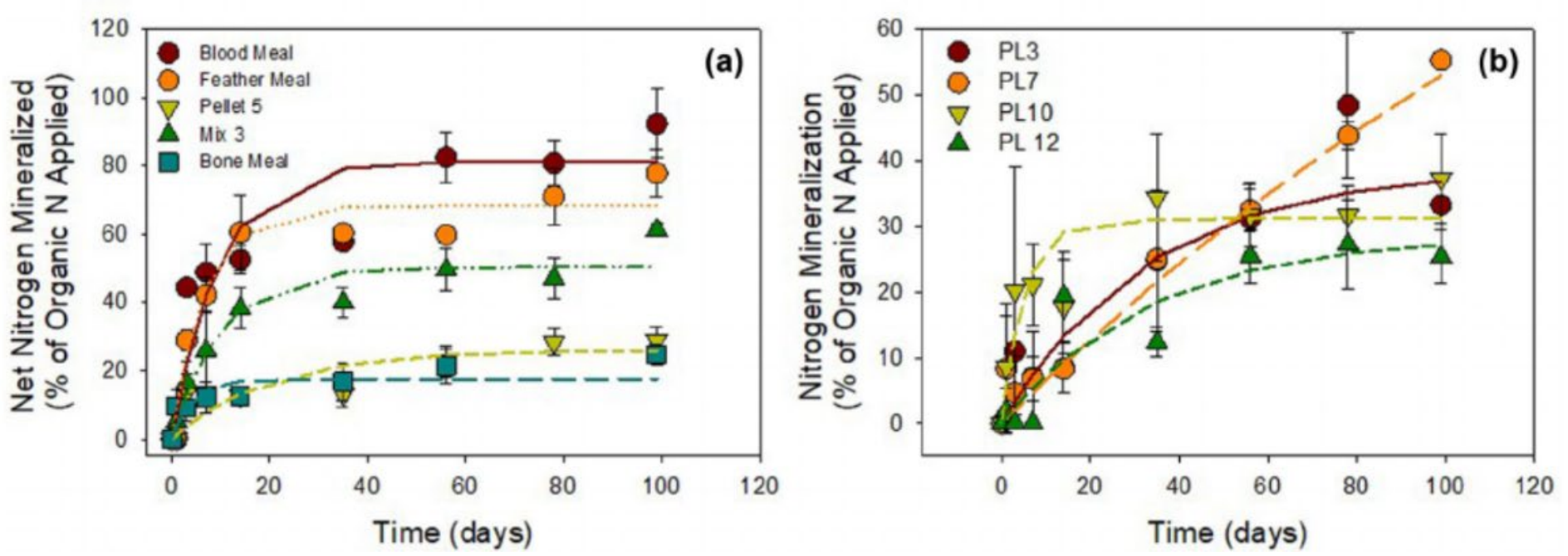
- Most are slow-release and depend on microbes to convert the nutrients to a plant-available form. Nitrogen is released more slowly from large particles.
- Typically, poultry litter, feather meal, bone meal, mined potassium (potash), magnesium, and sulfur
- Nitrogen concentration 2% (bone meal)-15% (feather and some blood meal); 1-9% in compost
- Special equipment is needed to incorporate granular fertilizer after plants are established, and if soil surface is covered in cover crop residue or plastic mulch
- Municipal waste and biosolids (milorganite) are not allowed in organic systems.

Liquid

- Expensive but effective
- Easier to apply after plants are established
- Can clog emitters
- Sodium nitrate is allowed with restrictions. It will be available quickly but use with caution to avoid salt build-up.
- Kelp (seaweed) and fish hydrosylate and emulsion have phytohormones that help plants grow and may protect from fungal disease when foliar applied.

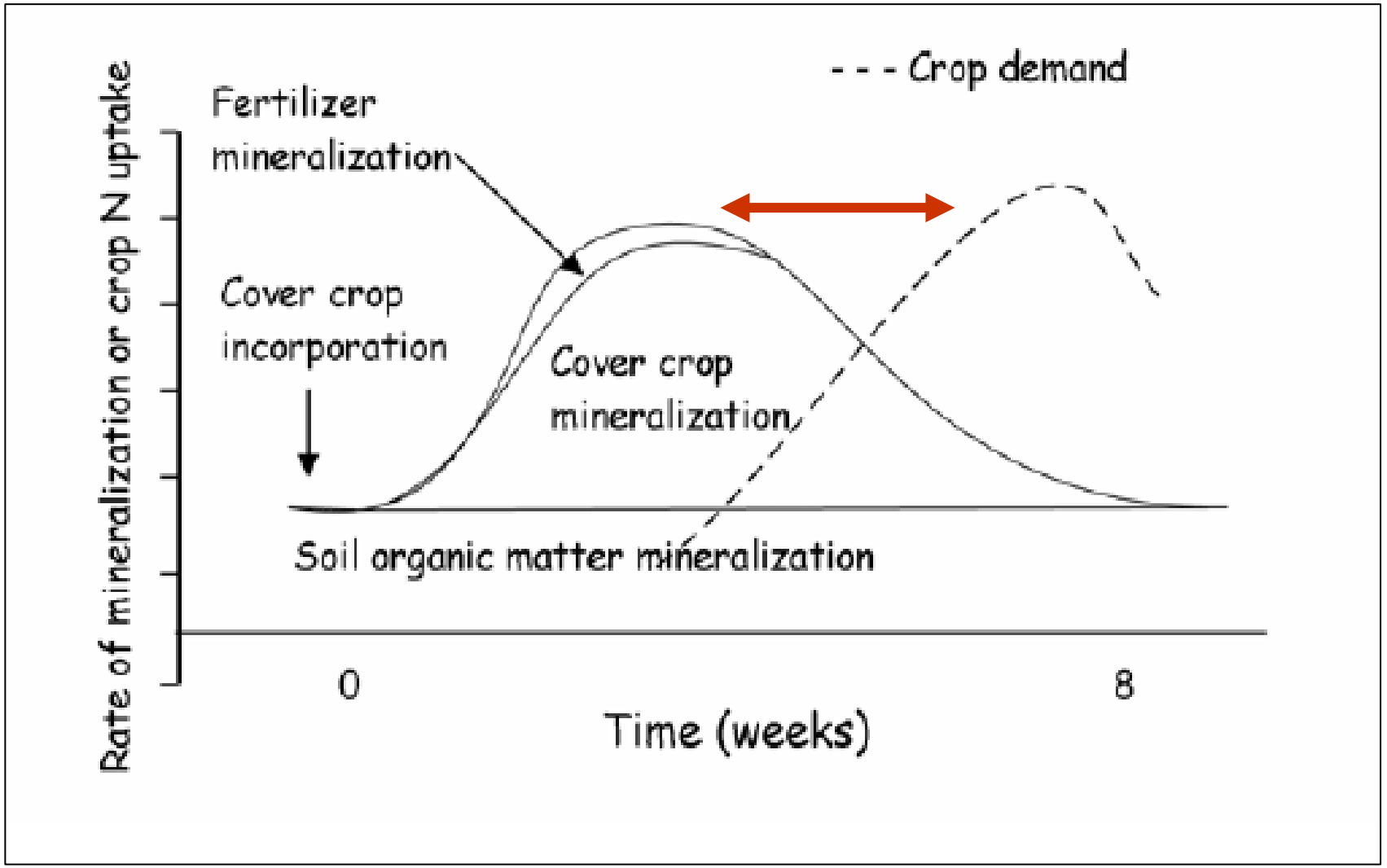
Both dry and liquid fertilizers can be custom blended by Florida suppliers to meet crop needs.

Selecting Fertilizer Sources



From: K. Cassity-Duffey et al., 2020. Nitrogen mineralization from organic materials and fertilizers: Predicting N release. https://acsess.onlinelibrary.wiley.com/doi/epdf/10.1002/saj2.20037

Goal: Synchronize N with Crop Demand



The dashed line and the solid lines should overlap!

Gaskell et al., 2006

Cover Crops Retain N in the Soil

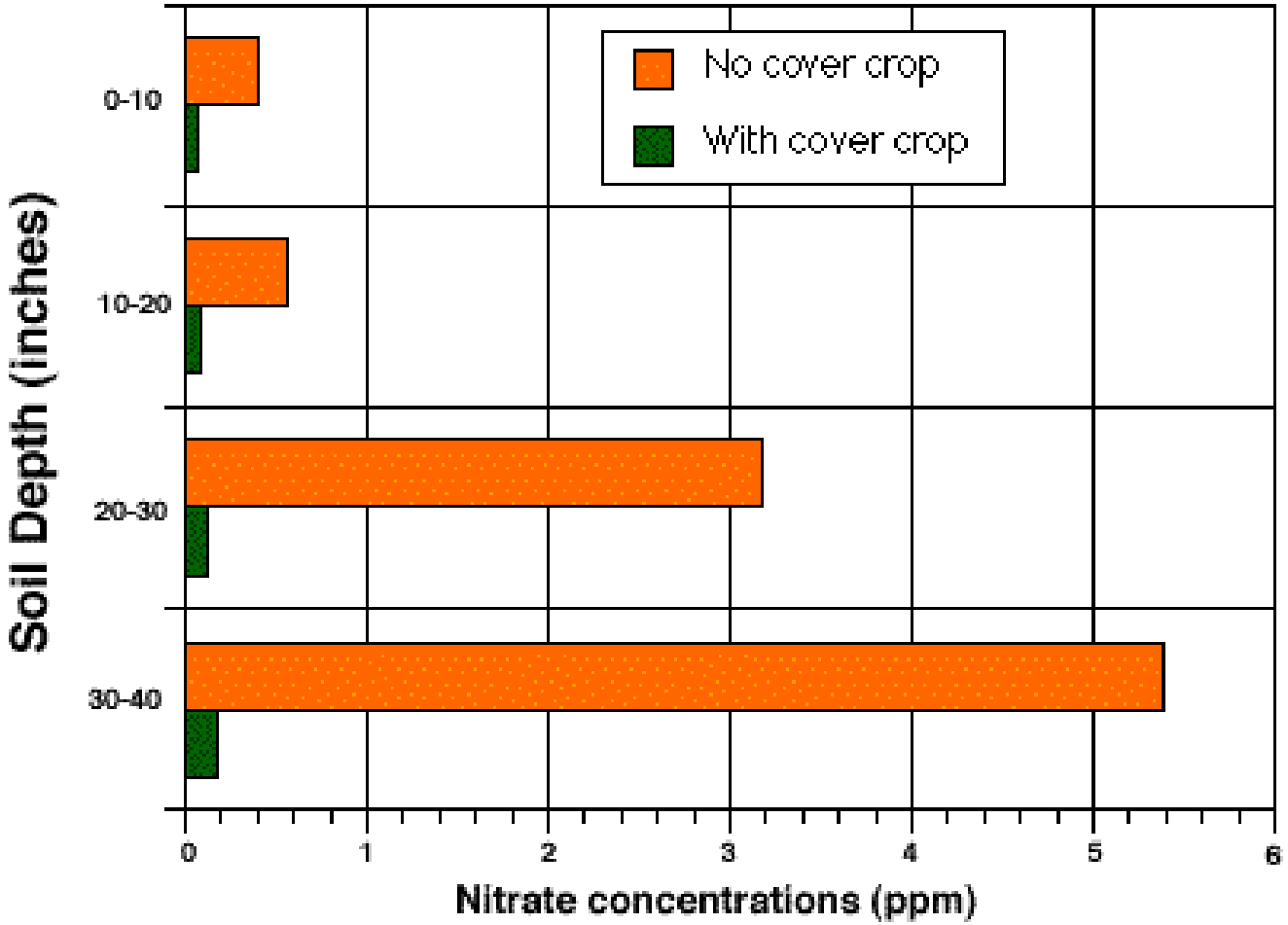
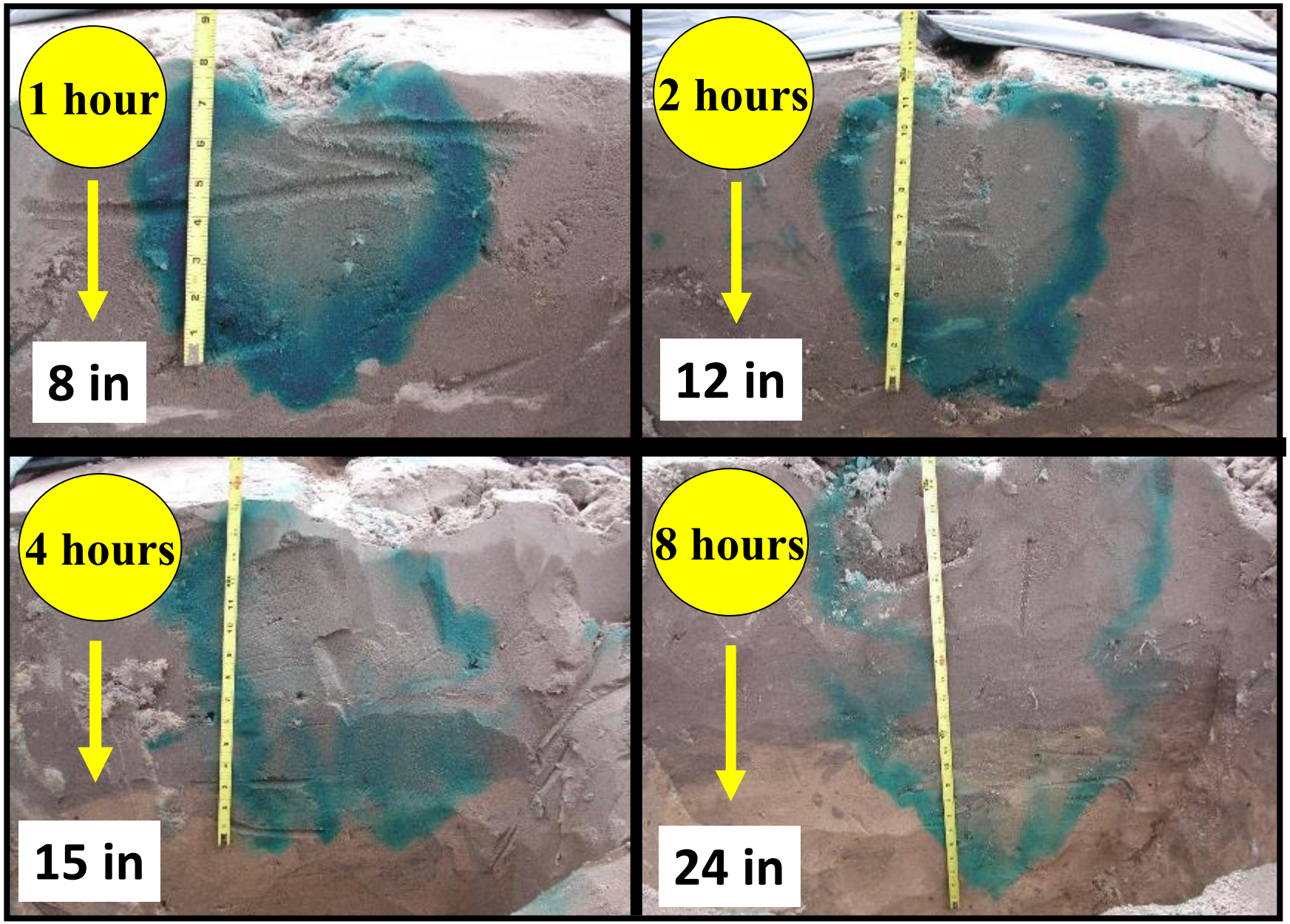


Figure 3. Effect of a cereal rye cover crop on soil nitrate concentrations (ppm) in broccoli plots fertilized the previous spring with 250 pounds N/acre. Samples were taken April 15, 1992. (Data from Hemphill and Hart, 1993.)

J. Luna, OSU, Corvallis

Proper Irrigation Retains N in the Soil

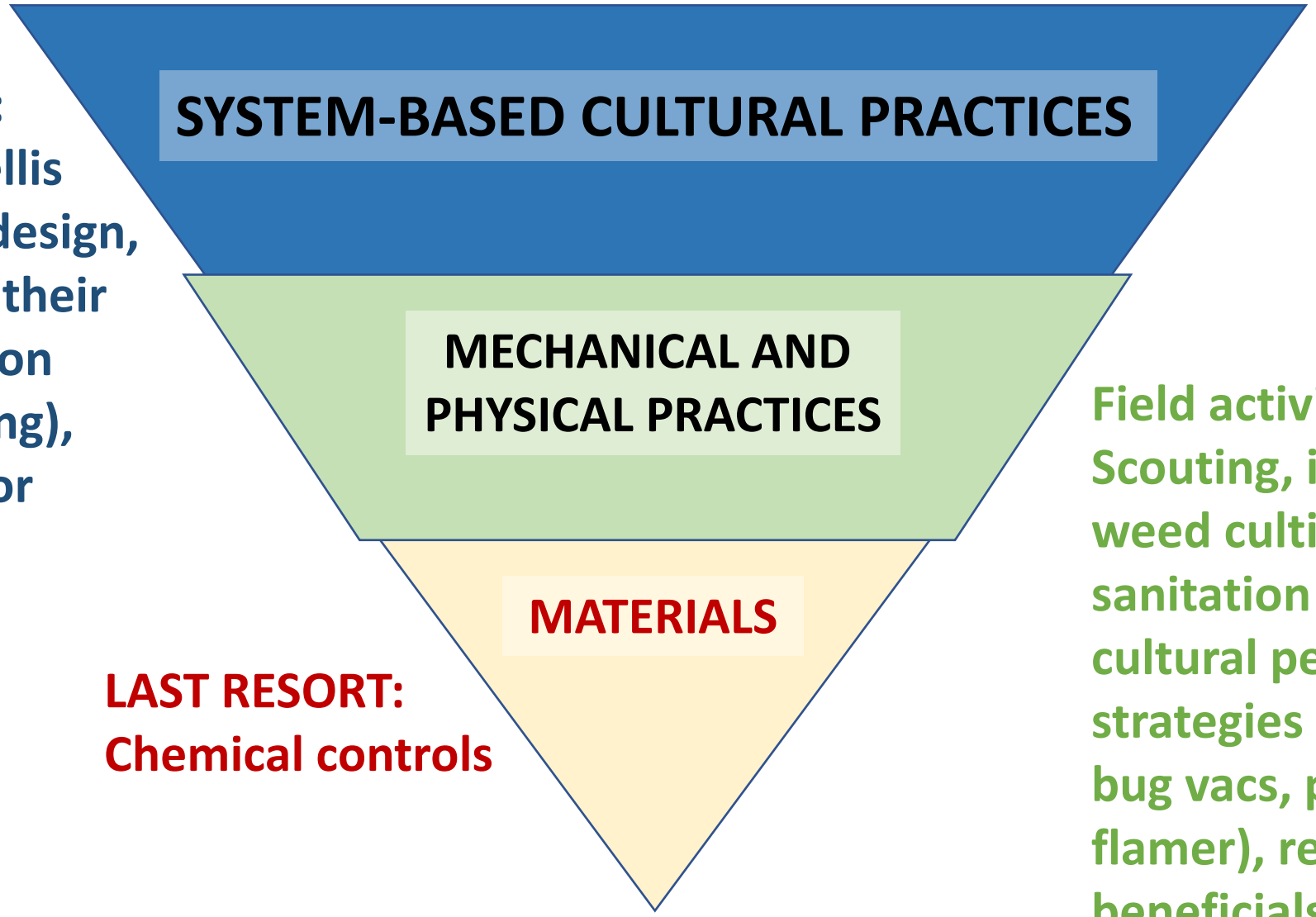


N and potassium reside in the soil solution and move with water, indicated by blue dye, after 1, 2, 4, and 8 hours of drip irrigation.

E. Simonne, *UF/IFAS*

Organic Pest Management

Pre-selection of:
Site, cultivar, trellis type, irrigation design, cover crops and their rotation, exclusion strategies (netting), habitat design for beneficials, etc.



LAST RESORT:
Chemical controls

Field activities, including:
Scouting, irrigation timing, weed cultivation, sanitation practices, cultural pest removal strategies (animal grazing, bug vacs, propane weed flamer), release of beneficials, etc.

Last Resort for Viral, Bacterial and Fungal Pathogens

- Elemental copper and sulfur
  - Sulfur is effective on powdery mildew, copper on Alternaria
- Botanical or horticultural oils
  - Helpful to reduce viruses vectored by insects. Powdery mildew also.
- Bicarbonates
  - Disrupts cell membrane. Effective on leaf spots and some rusts.
- Peroxides
  - Sanitizer. Works on plants and tools.
- Biofungicides and microorganisms
  - Typically, antagonistic or competitors. Tricoderma (a fungus) will help control Botrytis and Fusarium. Bacillus (a soil bacteria) promotes plant growth and helps control Ralstonia and Fusarium.

PHOTO: UF/IFAS
FL Vineyard
Early 1900's

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