USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

State Technical Advisory Committee Meeting
Updates to Agronomic Practices

MARYLAND

Overview of Agronomic Practices

- Soil Carbon Amendment – 336
- Nutrient Management – 590
- Pest Management Conservation Systems – 595
- Residue and Tillage Management, No Till – 329 (Planting Green)

Soil Carbon Amendment - 336

Purpose of the Practice

- Using carbon-based amendments to increase soil carbon and improve the physical, chemical, and biological properties of the soil.

Benefits to Soil Health from Adding Soil Carbon Amendments

- Increased microbial activity
- Increased nutrient cycling and nutrient-holding capacity
- Increased soil water holding capacity
- Increased aggregate stability
- Increased buffering capacity
- Darkening of soil color in the surface (A) horizon

Soil Carbon Amendment-336

- Eligibility requirements for Soil Carbon Amendment
  - Documented organic matter depletion
  - Up to date nutrient management plan
  - Fields that have a P-FIV < 150
  - Approved Soil Carbon Amendment Analysis
- Soil Carbon Amendment Practice Includes Scenarios for
  - Compost
  - Biochar
  - Compost/Biochar Mixes

Soil Carbon Amendment-336

- Practice Requirements
  - Application of at least 3 tons/acre compost or biochar
  - Approved analysis that meets all standards and specs
  - Updated compost analysis for each year of application
  - Updated nutrient management plan as required by MDA
- Updates for FY2025
  - Must be contracted for 2 out of 4 years on each field
  - Can be re-contracted if resource concern still exists

Table 1. Parameters for All Carbon Amendments

Parameter	Range	Unit
Feedstock	Report[1]	Type by %
pH	Report	pH units
Electrical Conductivity (EC)	Report	dS/m
Moisture	Report	%
Organic Matter/Carbon	Report	% DW[2]
Total Nitrogen	Report	% DW
Particle Size	Report	% per size class
Phosphorus	Report	mg/kg[4] DW
Potassium	Report	mg/kg DW
Calcium	Report	mg/kg DW
Magnesium	Report	mg/kg DW
Arsenic[3]	<41	mg/kg DW
Cadmium	<39	mg/kg DW
Copper	<1500	mg/kg DW
Lead	<300	mg/kg DW
Mercury	<17	mg/kg DW
Nickel	<420	mg/kg DW
Selenium	<100	mg/kg DW
Zinc	<2800	mg/kg DW

[1]Report results, also see criteria under amendment type.

[2]DW = Dry weight.

[3]Pollutant concentration limit values from US EPA Title 40 Part 503 STANDARDS FOR THE USE OR DISPOSAL OF SEWAGE SLUDGE. Follow State and local laws and regulations.

[4]milligrams per kilogram (mg/kg) = parts per million (ppm) = grams per ton (g t^{-1})

Table 2. Parameters for Compost Amendments

Parameter	Range	Unit
C:N	Report[1]	unitless
Organic matter	Report	% DW
Fecal coliform	<1000	MPN[2] per g dry compost
Salmonella spp.	<3	MPN per 4 g dry compost

[1]Report = Required results only, no threshold or range needs to be met.

[2]MPN = Most Probable Number.

Table 3. Parameters for Biochar Amendments

Parameter	Range	Unit
Total Ash	Report[1]	% of total mass, dry basis
Liming equivalent	Report	% $CaCO_3$
Organic Carbon (C_{org})	>10	% DW
$H:C_{org}$	<0.7	Molar ratio
Chromium	<1200	mg per kg DW

[1]Report = Required results only, no threshold or range needs to be met

County	Acres Contracted in FY2024	Certified Acres in FY24	Total Obligated in FY24
Caroline	5,019.70	0	$1,071,630
Cecil	1,080	19,564.30	$539,833.30
Kent	1,039.50	18,163.91	$762,124.91
Queen Anne's	1,074.80	0	$494,260
Somerset	31	0	$14,147
Talbot	3,918.90	378,600.10	$969,054.10
Grand Total	**12,163.90**	**416,328.31**	**$3,851,049.31**

Nutrient Management – 590

- Climate Smart Practice
- Can be contracted to bring producers into compliance with NM regulations
- Must be implementing a new or higher-level practice
- Nutrient Management Practice includes scenarios for
  - Manure injection or incorporation
  - Prescription nutrient efficiency- in season testing for split rate application
  - Precision nutrient application – variable rate N, P, and/ or K

Nutrient Management - Cont

- Precision Nutrient Application
- Updated for FY2025
  - Allow for either variable N or P and K under the precision scenario if it involves adding something new to the operation
  - Allows for flexibility if producer does not want to adopt all three at once
  - Variable rate N is often managed separately from variable rate P or K

Pest Management Conservation Systems-595

- Goals of Pest Management Conservation Systems
  - Maintain pest populations below economically damaging levels
  - Minimize harmful effects of pest suppression on human health and environmental resources
  - Minimize development of pest resistance

Pest Management Conservation Systems-Cont.

NRCS Roles in Pest Management

1. Adopt PAMS (Prevention, Avoidance, Monitoring, and Suppression) activities that protect natural resources
2. Evaluate environmental hazards associated with a client's probable pest management strategies
3. Mitigate the identified environmental hazards of pest management strategies through PAMS practices and activities
4. Inventory, assess, and suppress noxious and invasive weeds on non-cropland
5. Suppress weeds to ensure successful implementation and maintenance of permanent vegetative conservation practices

Pest Management Conservation Systems-Cont.

- NRCS does NOT:
  - Recommend pesticides for use
  - Recommend substitutions for specific pesticides
  - Recommend scouting thresholds
- Producers must always follow the label for specific use instructions
- Decisions about chemicals must be made by the producer in conjunction with a licensed consultant
- Refer clients to extension publications, consultants, etc.

Pest Management Conservation Systems-Cont.

To meet pest management requirements:

- Must have pest management plan outlining mitigation and risk prevention strategies prior to obligation
  - Can be written by a TSP or NRCS staff
- A pest management plan includes PAMS techniques and mitigation strategies
- Contract can include other supporting practices (crop rotation, cover crop, nutrient management, etc.)
- Can be contracted up to 5 years

Residue and Tillage Management – No Till (329)

- Beginning in FY24 No Till practice includes planting green scenario
  - For planting green scenario cover crop must remain growing until the time of planting

Cover Crop – Planting Green – Pest Management System

- For producers with known slug issues or interested in planting green
- Checklist can be used for proactive slug control to meet pest management standard
- Contracted alongside no-till planting green to mitigate slug issues

Slug IPM Plan for No-Till Systems

ANNUAL CHECKLIST

Use these guidelines to implement an Integrated Pest Management (IPM) plan to effectively manage slug populations while minimizing environmental risks. Before considering the use of pesticides, refer to the pesticide Application Checklist below to ensure that you are taking the right steps to protect the environment. Slug populations is one of the most damaging pests in Maryland, they can cause significant damage to crop particularly in areas with high moisture levels. To help maintain a healthy crop production, properly managing slug population through Integrated Pest Management practices is essential. For detailed guidelines and monitoring tools, refer to the slug management guidelines provided on the University of Maryland extension website. Use the checklist to track your progress and ensure integrative slug control throughout the growing season.

Effective slug control requires several considerations such as environmental conditions and crops selection (Greens, strawberries, grains, etc.) Slugs thrive in moist and cool environments. Understanding their behavior, such as their nocturnal feeding habits are essential for timing management practices. Encouraging IPM approach such as natural enemies can reduce slug damage. In case chemical control is needed it is crucial to choose and apply pesticides carefully as it can target other beneficial organism and tarnish water sources and soil. Regular monitoring and timely interventions are essential for successful slug management.

✓ Done	Monitoring and Control: To monitor for slugs, utilize old shingles, old boards, newspapers, or cardboard. Place these materials near the soil surface in at least five locations in early fall, spring, and early summer. Check for slugs after one week. There are no established economic thresholds for slugs, but a general guide is: 1-2 slugs (low), 2-3 slugs (medium), 4-5 slugs (high).
	• Monitor slugs in the fall to identify potential problem fields for the following spring.
	• Monitor slugs in the spring (30-35 days before planting) to identify areas that may need to be treated
	• Monitor germination rate to determine if replanting is necessary or if baits are needed
	• If slug levels are high (4-5 per shingle), apply baits when slugs are active and feeding on plants (usually at night)
	Field Management: Implement at least 4 of the recommended field strategies below.
	• Avoid early season insecticide applications that harm natural predators like ground beetles and centipedes that are feeding on slugs.
	• Use starter fertilizer to boost early seasonal growth
	• Plant varieties that have good emergence and seedling vigor qualities, early growth will help outgrow the slug problem.
	• Remove residue from a 10-12" wide zone on the seed row
	• Adjust planter closing wheels and downforce mechanisms to seal seed furrows and prevent slug highways

Pest Management for Herbicide Resistant Weeds

- Use annual Checklist to monitor and manage herbicide resistant weeds when present on cropland

ANNUAL CHECKLIST

Use the following procedures to manage and prevent the spread of known herbicide-resistant weeds. For additional information about assessing the risk of developing herbicide-resistance visit https://hracglobal.com/prevention-management/best-management-practices.

✓ Done	Prevention and Monitoring: To monitor for herbicide-resistant weeds, Scout for weeds 10-14 days after herbicide application and to assess herbicide effectiveness. There are no established economic thresholds for herbicide-resistant weeds but eliminating seed production should be the primary goal.
	• Start the season clean with no living weeds at planting.
	• Sanitize and clean all equipment before entering fields to ensure all equipment is weed free.
	• Purchase weed free cash crop and cover crop seeds.
	• Begin scouting in early spring and continue throughout growing season for known herbicide-resistant weeds such as marestail, Palmer amaranth, ragweed, etc.

✓ Done	Cultural Control: Implement at least 2 of the recommended field strategies below.
	• Diversify crop rotation, the greater the diversity of the crop rotation the greater the ability to break up weed cycles. Including winter annual or perennial crops in rotation provide additional control measures for difficult to manage weeds.
	• Follow all nutrient management recommendations to ensure healthy, vigorous, crop growth.
	• Consider planting a fall cover crop such as cereal rye or a combination of cereal rye + hairy vetch. A living cover crop or cover crop residue must be present for adequate weed suppression. Delaying cover crop termination or planting green will increase the likelihood of success.
	• Reduce row spacing to ensure faster canopy establishment. Row spacing of 15 inches or less is recommended for soybeans.

✓ Done	Chemical Control: Implement at least 8 of the recommended field strategies below.
	• Apply herbicide at the **full-recommended rate** at the proper time to maximize control. o Preemergence/residual herbicides should be applied as close to planting as possible o Postemergence herbicides should be applied when weeds are small (<3-4 in.)
	• Rotate HRAC groups each year.

Opportunities for Integrating Drones

- Cover Cropping
- Nutrient Management
- Pest Management

- Must work with local field offices to ensure what is being implemented meets current standards

Questions?

- Thank you!

Contact information:

Dana Rushovich
State Agronomist
Dana.Rushovich@usda.gov
443-991-9033