Overview of Maryland Agricultural Experiment Station (MAES) and RECs

Puneet Srivastava, Ph.D., P.E.
Associate Dean for Research and Associate Director of MAES
Maryland Agricultural Experiment Station (MAES)
College of Agriculture and Natural Resources

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Maryland Agricultural Experiment Station

Established in 1888

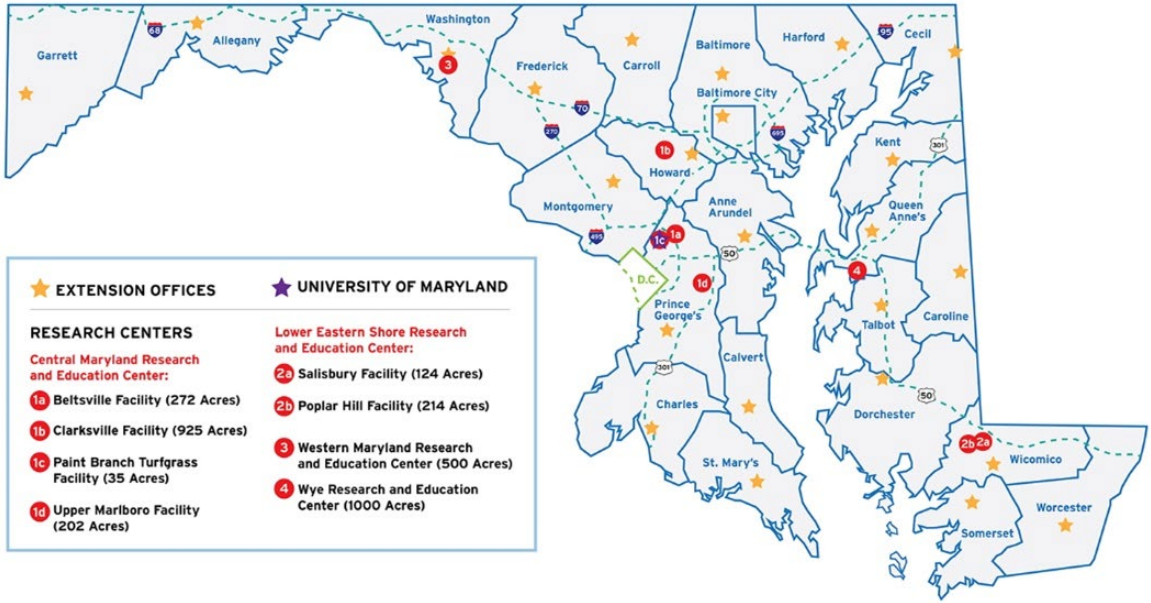
A 135-year history of serving the agricultural community and the state.

Maryland Agricultural Experiment Station (MAES)

MAES **supports research functions** of the College of Agriculture and Natural Resources.

Research in the College of Agriculture and Natural Resources is conducted both **on campus** within the **six academic departments** and **off-campus at 8 locations organized as four Research and Education Centers (RECs)** that are part of **MAES** representing diverse geographic regions across the state.

Extension offices in **every county** and in **Baltimore City**



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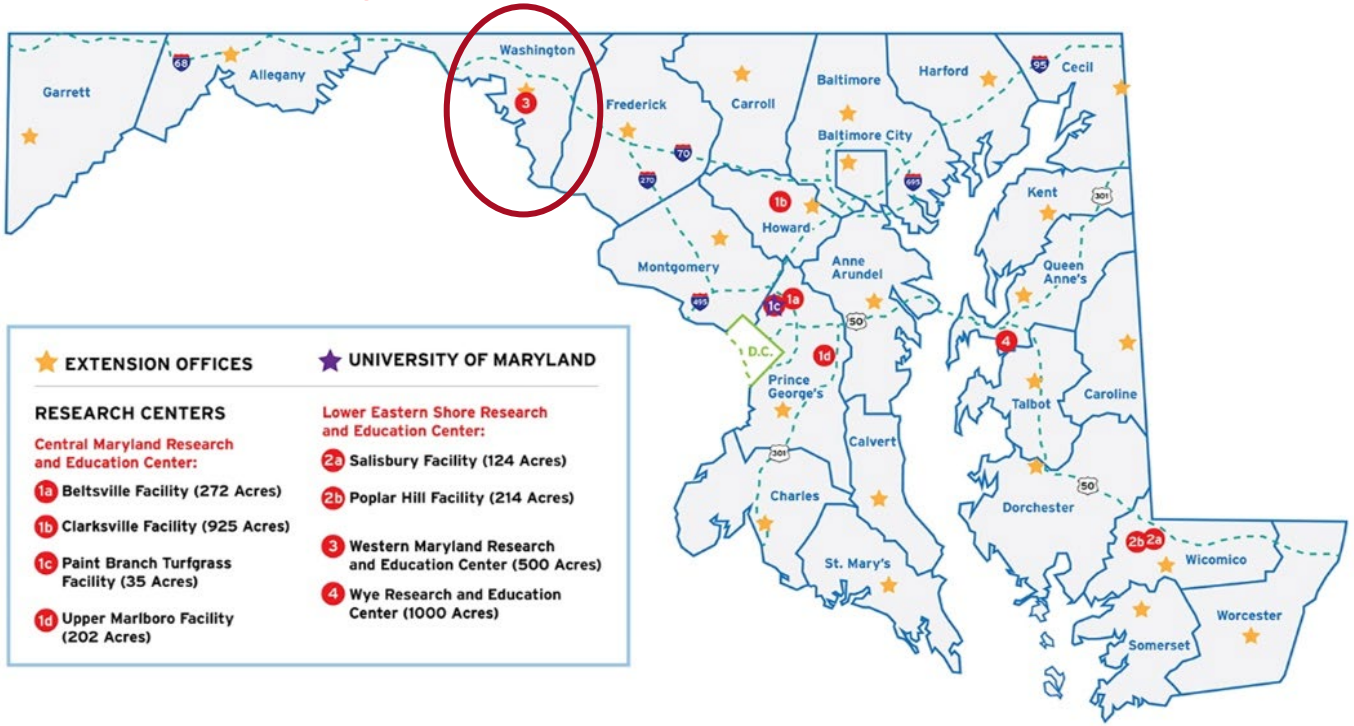
Maryland Agricultural Experiment Station (MAES)

Western Maryland Education & Research Center



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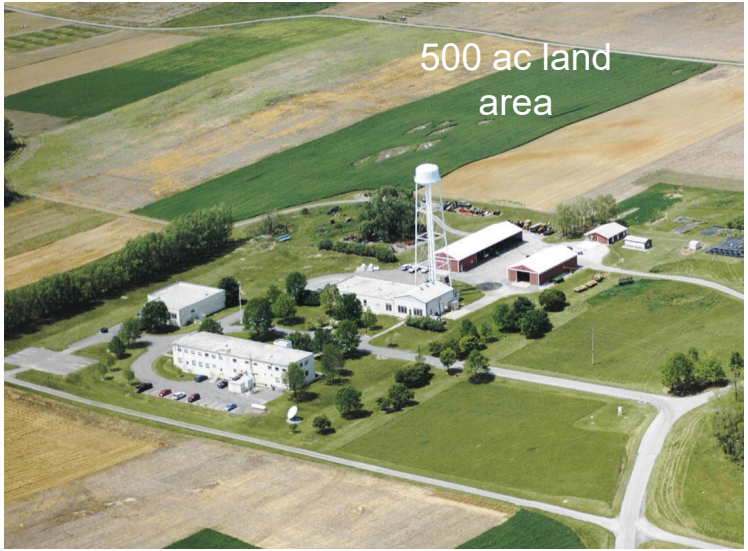
Western Maryland Research & Education Center – Keedysville, MD



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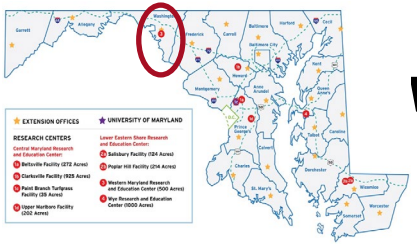

Western Maryland Research & Education Center

Grape Research (Joseph Fiola)

- **Cultivar testing**
  - Evaluate traditional and newly developed grape varieties as well as special clones of varieties under Maryland conditions.
- **Pest Control/Vineyard Nutrition**
  - Integrated Vineyard Management research and delivery program to:
    - Maximize fruit quality and vine cold-hardiness.
    - Control diseases with environmentally-friendly procedures.
    - Extensive tissue sampling and subsequent nutrition/fertility recommendations for commercial vineyards in the state.
- **Enology**
  - Small batch enological studies on new grape varieties to determine the wine quality.

Vineyard at Western Maryland Research and Education Center (WMREC)

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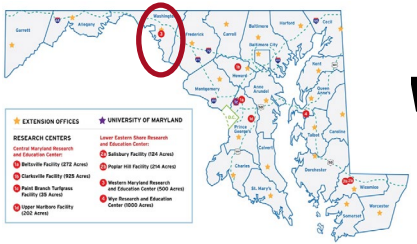
https://extension.umd.edu/programs/agriculture-food-systems/program-areas/fruit-vegetable-production/grapes-and-fruit



Western Maryland Research & Education Center

Fruit Tree research (Christopher S Walsh)

- **Apple research**
  - Developed two varieties of apples (MD-TDAP1 and MD-TDAP2) that are:
    - Heat tolerant
    - Blight tolerant
    - Low maintenance (requires much less hand labor).
  - *Both apple varieties have been approved for patents and are awaiting final grant from the U.S. Patent Office.*

Two new apple varieties developed at UMD
(picture from: https://today.umd.edu/apples-adapted, https://agnr.umd.edu/news/adapting-apples-times)

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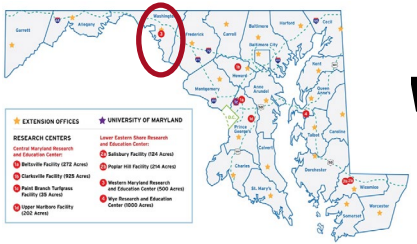
https://extension.umd.edu/programs/agriculture-food-systems/program-areas/fruit-vegetable-production/grapes-and-fruit/tree-fruit



Western Maryland Research & Education Center

Hops Research (Bryan R Butler)

- **Hops and Barley research**
  - Evaluate how different varieties of Hops would grow in Maryland.
  - Resistance to insects, diseases
  - Fertility requirements
- **Planted the first crops (Monocacy Hop) under commercial conditions at the research farm (in 2022)**
- **A new course of study at the University of Maryland focused on fermentation.**
- **Collaboration with a local brewery: Flying Dog Brewery**

https://extension.umd.edu/programs/agriculture-food-systems/program-areas/fruit-vegetable-production/grapes-and-fruit/hops

Hops production at WMREC
(picture source: https://extension.umd.edu/resource/hop-production)

Bryan Butler working on developing a type of Hops that can thrive in Maryland's climate
(Picture source: https://dbknews.com/2019/09/02/umd-beer-hops-research-bryan-butler-maryland/)

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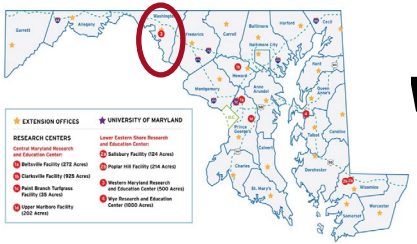

Western Maryland Research & Education Center

Small Ruminant Research (Jeff Sempler)

- **Small Ruminant Research**
  - Compare the growth, carcass, and fertility traits of ram and lambs
- **Forage production**
  - Investigate various forage production methods under both conventional and organic management.

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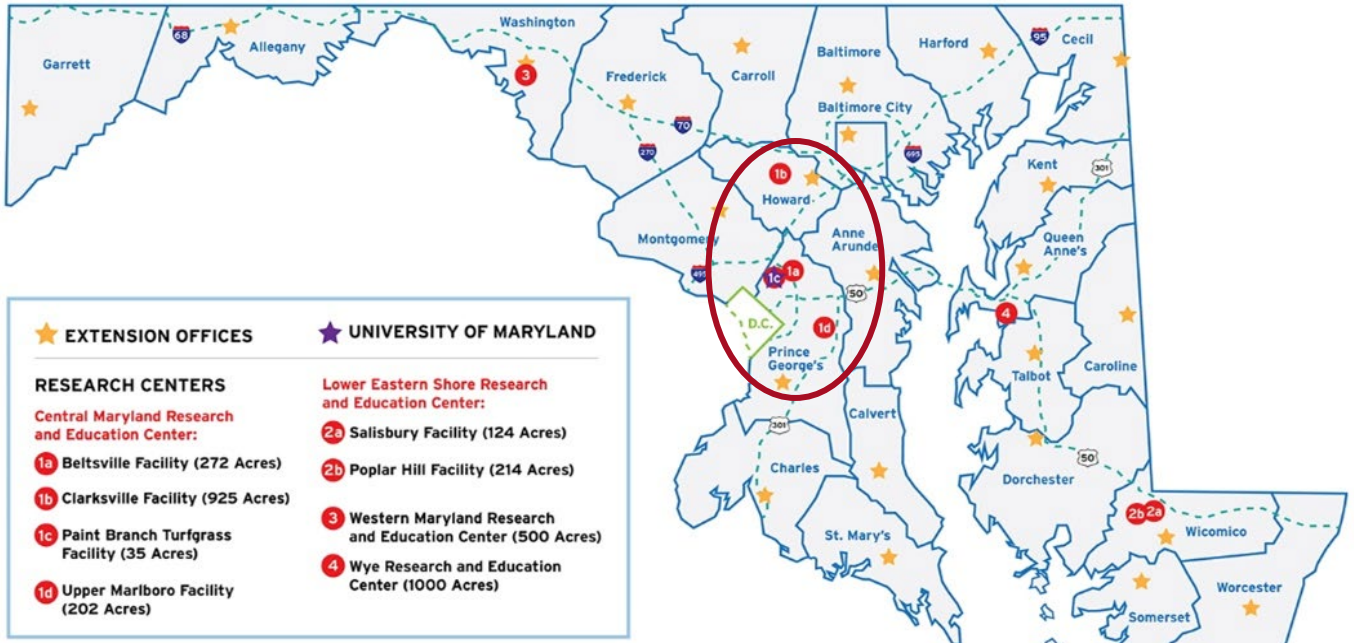
Central Maryland Research & Education Center



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Central Maryland Research & Education Center – Clarksville, MD

Central Maryland Research & Education Center – Beltsville, MD

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Central Maryland Research & Education Center – Upper Marlboro, MD

TERPFARM

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Central Maryland Research & Education Center – College Park, MD
Paint Branch Turfgrass Facility

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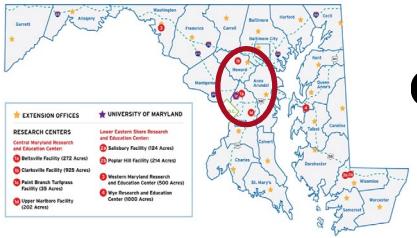

Central Maryland Research & Education Center

Terp farm @ Upper Marlboro

- **Sustainable vegetables for Dining Terps at UMD**
  - A 3-acre plot @Upper Marlboro facility of Central Maryland Research and Education Center (CMREC).
  - Grows vegetables year-round for campus dining halls, catering, and Campus Pantry (which serves food-insecure members of the campus and College Park communities).
  - Sustainable farming operations:
    - Crop rotation
    - Cover cropping
    - Organic fertilizers and pest controls
    - Planting habitat for beneficial insects
  - *The project also hosts students for internships, classes, volunteering, etc.*

Farming operations at Terp Farm

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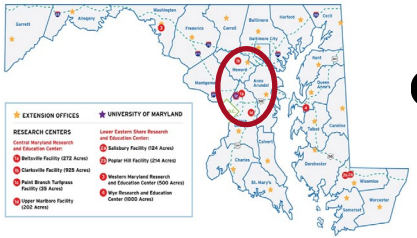

Central Maryland Research & Education Center

Soil health, cover crops, organic farming, thriving agriculture (Ray Weil)

- **Cover crops to enhance environmental quality and farm profitability**
  - Impacts of cover crop planting and termination dates on cover crop biomass, N content, and N losses for different cover crop mixtures.
  - New cover crop development for a wide range of benefits including alleviation of soil compaction, capturing excessive N etc.
- **Soil health**
  - Soil health and nutrient flows with enhanced cover cropping and soil management.
  - Sulfur management to enhance protein quality and yield health of legumes
- **Strategies for transitioning to organic grain production**
- **Thriving agriculture in Urbanizing landscapes**
  - Nutrient cycling, and the management of cover crops to minimize runoff and nutrient losses while enhancing productivity and profitability in no-till production systems.

Strategies for organic farming

Development of new cover crops for expanding cover crop benefits

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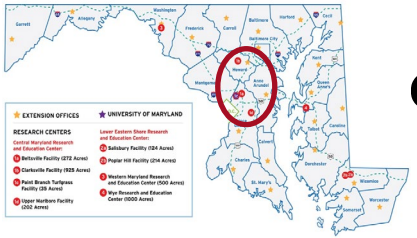

Central Maryland Research & Education Center

Integrated Pest Management (Kelly Hamby)

- **Pest management**
  - Evaluate the interactions between pests and free-living fungi for understanding pests and pathogens outbreak.
- **Spotted Wing Drosophila projects**
  - Canopy management control structures
  - pesticide spray optimization in Maryland bramble crops
  - Evaluate crop sterilants for management of spotted wing drosophila and fruit rots.
- **Grain crops**
  - Study current insect pressure and distribution in Maryland grain crops to improve the efficacy and efficiency of pest management crops.

Soybean field at Central Maryland Research and Education Center (CMREC).

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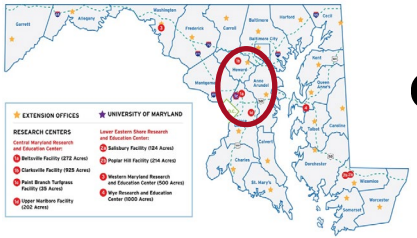

Central Maryland Research & Education Center

Dairy and forage management (Eduardo Rico and Fabiana Cordosa)

- **Dairy cow health during the peripartal period**
  - Ketosis research:
    - Understand key factors that can help determine positive and negative trajectories of health during postpartum period due to ketosis.
  - Energy coenzyme and metabolic transition research.
- **Nutrition and its effect on productivity and health of dairy cows**
  - Identify novel strategies for improving the efficiency of milk production while enhancing dairy cow health.
- **Forage management and quality**
  - Alfalfa hay quality and its impact on dairy cow's performance.

Research dairy cows at Central Maryland Research and Education Center (CMREC).

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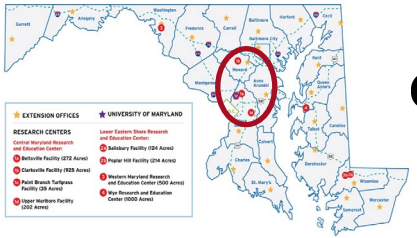

Central Maryland Research & Education Center

Dairy and Beef (Amanda Grey and Sarah Potts)

- **Support forage producers, livestock owners, and industry professionals through a combination of research and extension programming in forage production and pasture management**
- **Nutrition management**
  - Managing bloat in pastured cattle
  - Feeding of gestation cow
  - Estimating winter forage feed needs of Cow-Calf herd
- **Calf management**
  - Colostrum feeding study with Jersey calves
- **Health and reproductive management**
  - Cattle deworming
  - Effects of heat stress

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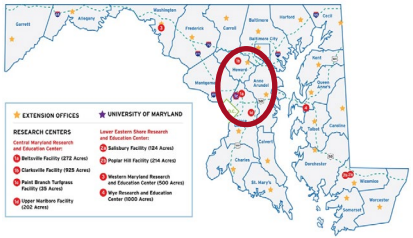
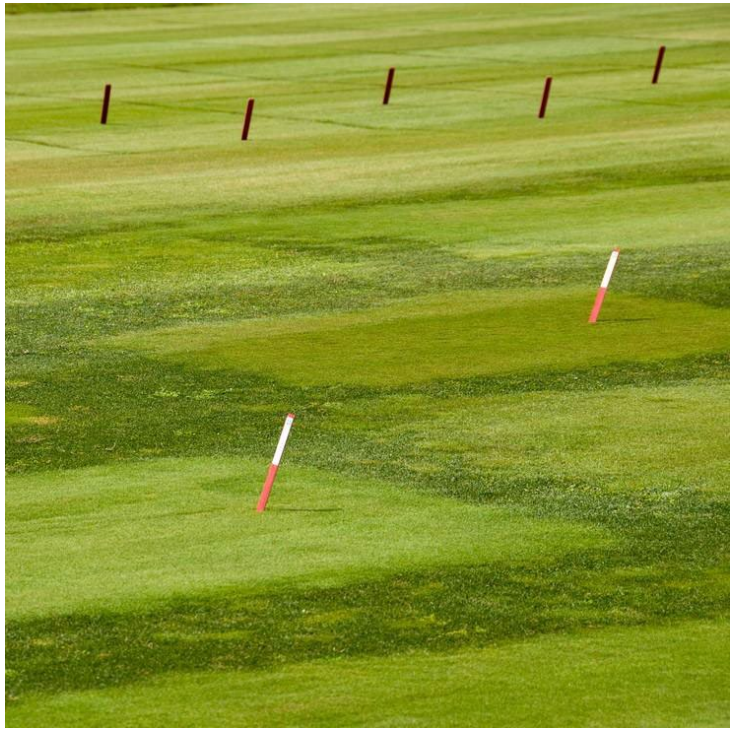


Central Maryland Research & Education Center
Paint Branch Turfgrass Facility

- **The main thrust of the research concerns Turfgrass** but there are also other studies looking at wildflowers and ornamental/native grasses.
- **There are four full-time turfgrass researchers in the program:**
  - Disease of Turf, and Weed Control
  - Soil Fertility, and Variety Evaluations
  - Plant Physiology, and Pesticide Fate
  - Organic lawn
  - Entomology and IAA (2 year) Turf Program
- **The turf farms is utilized for hands-on education of all aspect of turf management and turf science.**

Central Maryland Research and Education Center (CMREC)
Paint Branch Turfgrass Facility
https://agnr.umd.edu/research/research-and-education-centers-locations/cmrec/paint-branch



Turfgrass management research at Paint Branch Turfgrass facility (CMREC).

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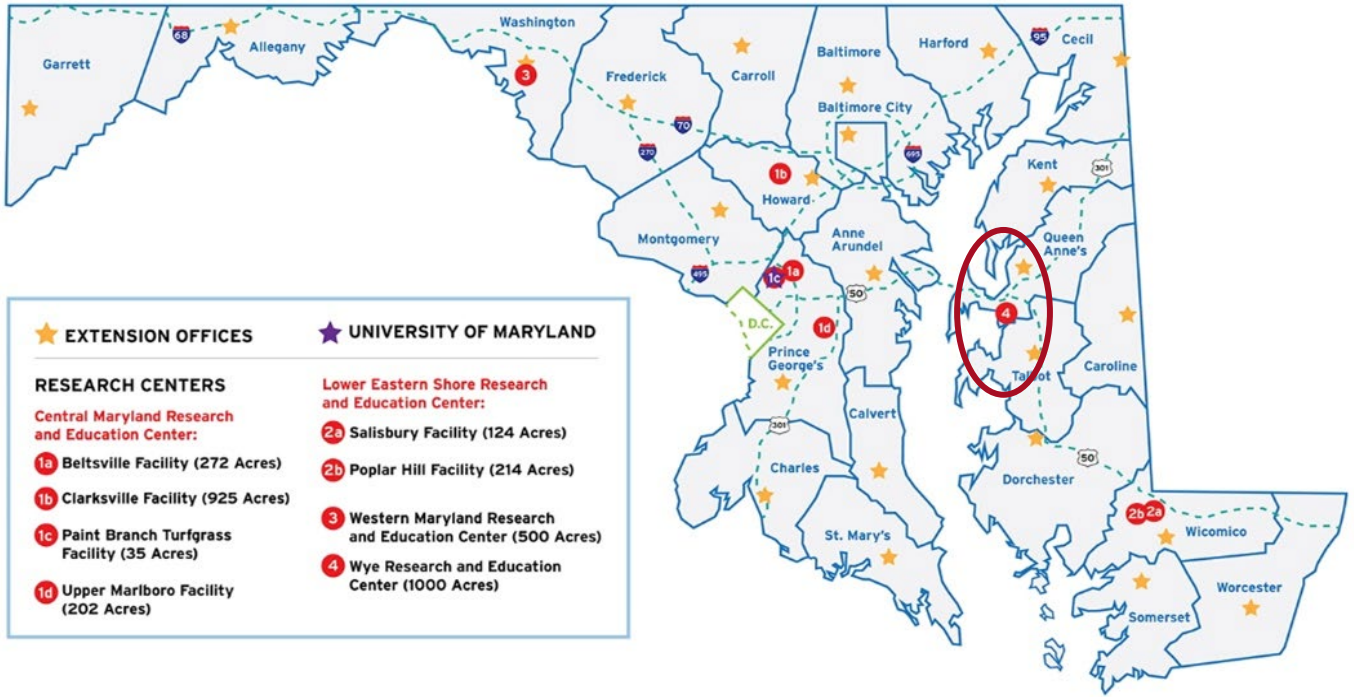
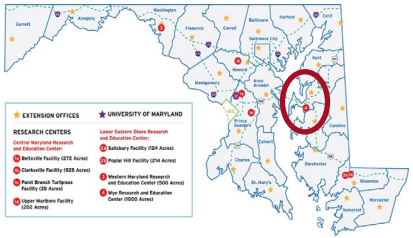
Wye Research & Education Center



Wye Research and Education Center – Queenstown, MD



Wye Research and Education Center

Hemp Research (Nicole Fiorellino and Andrew Ristvey)

- **Industrial Hemp Research**
  - Fertilizer recommendation on floral hemp.
  - Management recommendation for fiber hemp
  - Climate change adaptations – adjustment to planting dates, incorporating novel cover crop into rotations
- **Legacy phosphorus remediation**
  - Evaluating P drawdown rates in soils with continued cropping with no application of P
  - Use of industrial hemp as a phytoremediator of high P soils

Industrial hemp research field at the Wye Research and Education Center (Wye REC).

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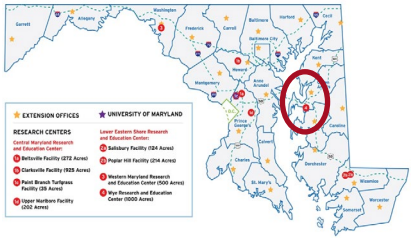


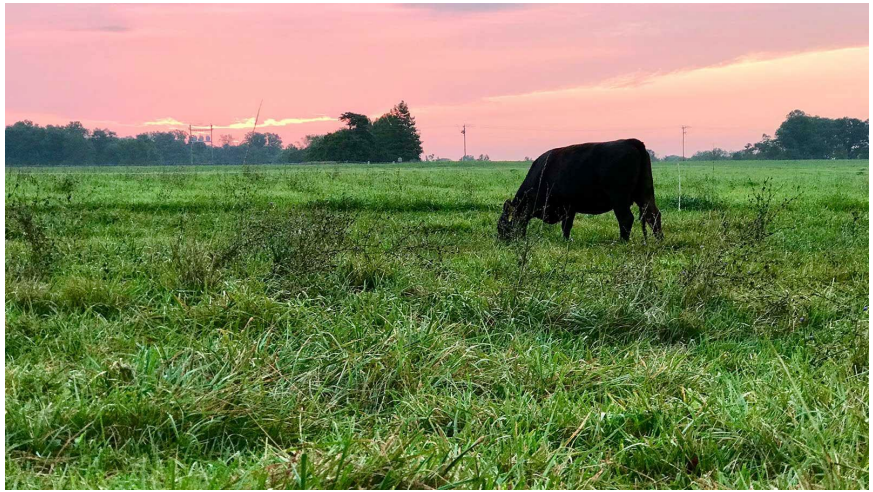
Wye Research and Education Center

Wye Angus Program

The Wye REC is home to the Wye Angus Program and the heavily studied herd of Angus cattle. Between 1942 and 1958, Wye Plantation imported 19 bulls from the British Isles. Those bulls are responsible for about 75 percent of the germplasm now in the herd. The Wye Angus herd was closed to the introduction of additional germplasm in 1958.

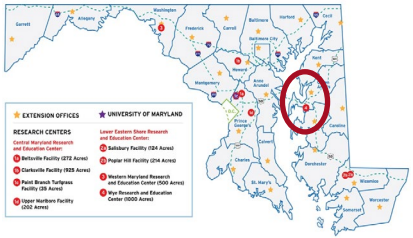
The availability of this closed breeding population provides unique advantages in terms of conducting basic and applied beef cattle research.

- **Grass Fed vs. Grain Fed Steer Projects**
  - Use of dietary interventions to produce highly palatable and nutritious beef products.
  - Comparison of parasite levels



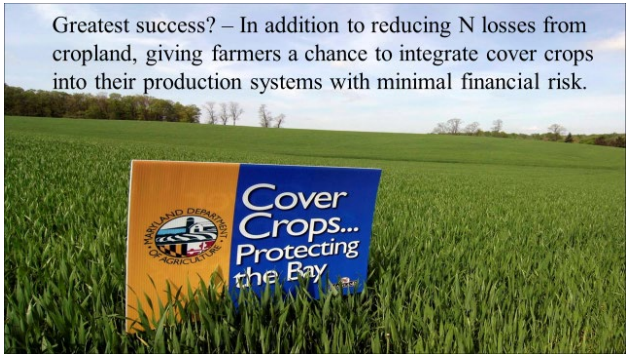
Angus cattle at Wye Research and Education Center (WyeREC).

https://agnr.umd.edu/research/research-and-education-centers-locations/wye-research-education-center/wye-angus



Wye Research and Education Center

- **The Wye REC is home to the Harry R. Hughes Center for Agro-ecology.**
  - The Hughes Center finds consensus between interests representing agriculture, forestry and the environment to solve some of the greatest issues facing these critical sectors in Maryland which ultimately impact all citizens of the state.
- **Cover Crop Research**
  - Wye Research and Education Center played a critical role in establishing the Maryland Department of Agriculture's Cover Crop Program.
- **Other Research include**
  - Pollinator research, grape research, corn and soybean research, genetics and genomics of small grain crops (wheat, barley, triticale), hemp research, and aquatic plants, shellfish, and finfish.



Harry R Hughes Center for Agro-ecology
https://agnr.umd.edu/research/research-and-education-centers-locations/harry-r-hughes-center-agro-ecology

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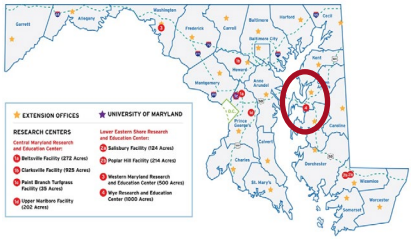

Wye Research and Education Center

Wheat Genomics (Vijay Tiwari)

Genomics of small grains like wheat, barley, and Triticale towards utilizing genomic data in the post-reference genomes era **for increasing resilience to biotic and abiotic stresses and improved quality, and at the same time minimizing the ecological footprint.**

- **Producing more pathogen and pest resilient forms of wheat**
  - Breeding pathogen and pest-resistant genes from ancient species of wild wheat into domestic wheat varieties.
- **Molecular understanding of yield and yield contributing factors in bread wheat**
  - Identify key genes that play important role in spike morphology and grain number per spikelet

Wheat genomics research and outreach activities

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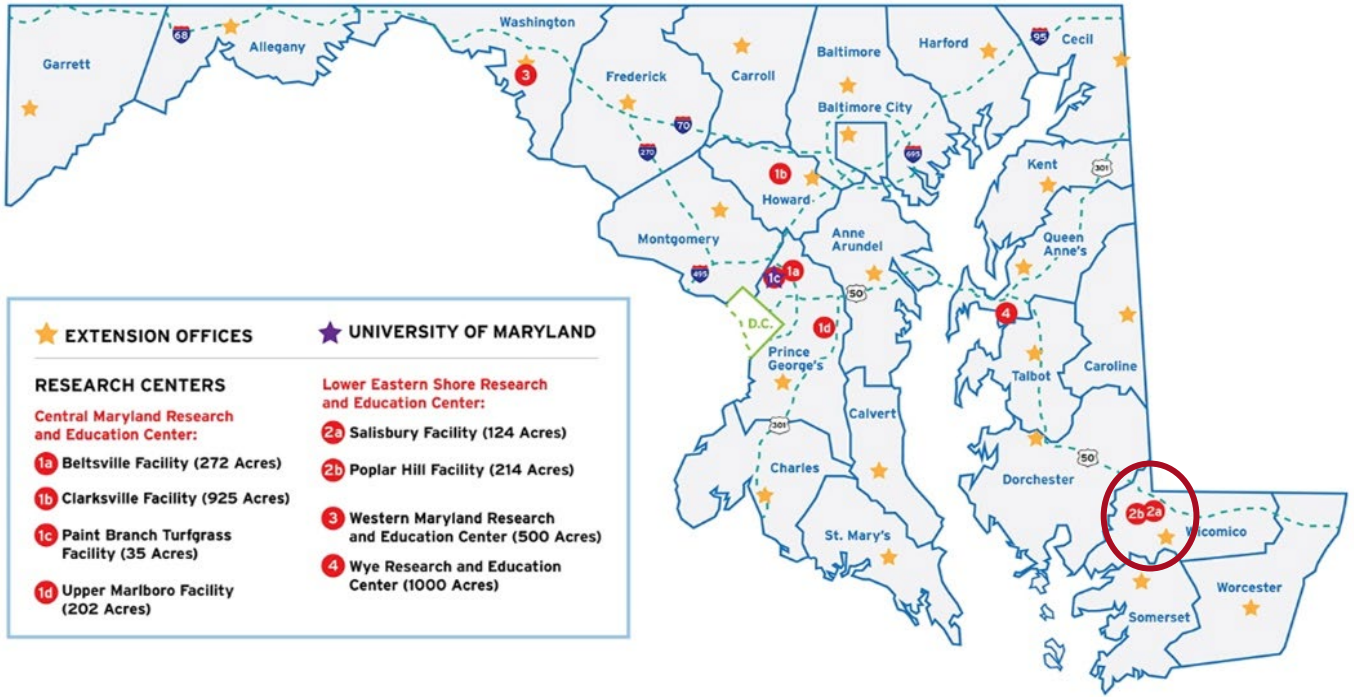
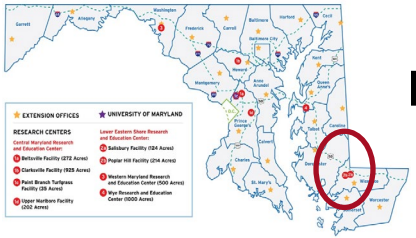
Lower Eastern Shore Research & Education Center



Lower Eastern Shore Research & Education Center – Salisbury and Poplar Hill, MD



Lower Eastern Shore Research & Education Center

Climate smart agriculture, saltwater intrusion, Precision agriculture, Soil health (Kate Tully)

- **Climate smart agriculture**
  - Integrating poultry litter-switchgrass systems for biogas production and climate change mitigation.
- **Saltwater intrusion**
  - Investigate the impacts of sea level rise and saltwater intrusion on coastal farmlands in the Chesapeake Bay region.
- **Precision agriculture**
  - Increase the adoption of sustainable agricultural practices by developing decision support tools, real-time on-farm monitoring systems, and flexible remote sensing technologies.
- **Soil health**
  - Improving soil health in both organic and inorganic agricultural systems through field-based experiments, meta-analysis of scientific literature.

Cornfield inundated with saltwater in low-lying Chesapeake Bay area (Kate Tully)

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Maryland Agricultural and Experiment Station (MAES)

Potential areas for research and Extension/outreach activities at all RECs

- Instrumentation and robotics in agriculture (fruits, crops, dairy, turfgrass)
- Climate change adaptation and mitigation through climate smart agriculture:
  - Agrivoltaics
  - Energy production using dairy waste
  - GHG emissions reduction and carbon sequestration
  - Salt-water intrusion
- Precision agriculture
  - Irrigation
  - Nutrition management
- Entomology research and outreach
- Pest and Diseases
- Onsite wastewater treatment research and outreach
- Organic farming and cover crops
- AI and robotics in poultry production
- Wetlands research (C sequestration and emissions)

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Maryland Agricultural Experiment Station (MAES)

Maintain and runs these facilities with the help of staff stationed at RECs.

Facility staff works closely with researchers and Extension personnel on their projects.

Campus faculty use the RECs to provide hands-on opportunities.

Extension faculty at the facilities, conduct research projects and provide non-formal educational programs.

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AGNR's Strategic Initiatives:
https://agnr.umd.edu/about/strategic-initiatives

AGNR Research Page: https://agnr.umd.edu/research

Research Centers and Locations:
https://agnr.umd.edu/research/research-and-education-centers-locations

Urban Agriculture https://go.umd.edu/urbanag