Vol. 4 · December 2023

The Stalk

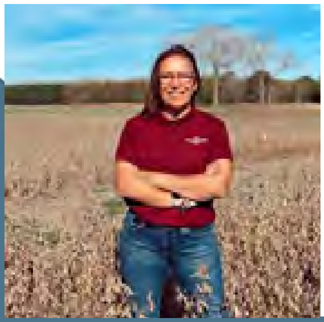
Accomack & Northampton County Cooperative Extension
Eastern Shore Agricultural Research & Extension Center

Northampton County's NEW VCE Ag Agent

Hélène Doughty has an undergraduate in Secondary Education from Salisbury University and a Masters of Science from Virginia Tech in Agriculture and Life Sciences. Hélène began her career in agriculture as a field and laboratory aide for from 1993 to 1997 at the ESAREC, and subsequently worked with agribusiness retailers in Northampton County until 2005. She has held the position of Research Specialist Sr. in entomology with the ESAREC for close to 18 years, working on research and extension programs in vegetable, agronomic, nursery and horticultural crops.

Hélène is actively involved in her Northampton County community, currently serving or having served on the Eastern Shore Ag Fair committee, the Northampton County Education Foundation board, the Northampton County Public Schools board as district 2 representative, and the Northampton County Historical Society. Hélène also volunteers with her local volunteer fire company, providing support with events and social media needs. She is looking forward to identifying community needs and providing support, resources and building extension programs to benefit Northampton County agricultural and natural resources partners, stakeholders and the community at large. Hélène loves to help and volunteer in her community. She enjoys gardening, photography and graphic design, and spending time with family and friends. Stop by the Northampton County Extension Office at any time to meet your new extension agent.

Hélène Doughty
Northampton County Agricultural and Natural Resources Extension Agent
hdoughty@vt.edu or (757)999-0780



This Issue:

Merry Christmas and Happy New Year!

Plastic Pesticide Jug Recycling

If you would like to participate in the annual plastic recycling program, please take a look around the farm, triple rinse any pesticide containers and remove the caps and labels. You can take any jugs for recycling to Nutrien's Keller office or to the Northampton County Landfill. As a reminder, only properly triple rinsed pesticide containers will be accepted. Ag Plastic Solutions will gladly take fully and properly triple-rinse containers but can NOT take dirty containers. Please see the pesticide container inspection checklist for more information on how clean these jugs need to be in order to be recycled.

2024 Eastern Shore Agricultural Conference and Trade Show

The 34th annual Eastern Shore Agricultural Conference & Trade Show will be held on Wednesday and Thursday, January 24th & 25th, 2024 at the Exmore Moose Lodge 683, located at 15315 Merry Cat Ln, Belle Haven, VA 23306. We hope that you will plan to be a part of this event.

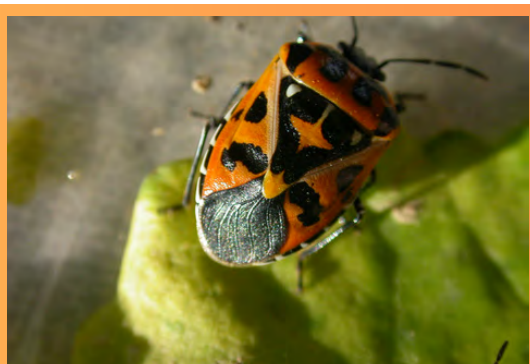
Please see the Conference agenda on page 3. We extend heartfelt thanks to our vendors and sponsors as their contributions make this event possible each year. We encourage you to share sponsorship and exhibitor information with any agribusinesses you'd like to see at the Ag Conference this year.

The Annual Ag Conference Oyster Roast will be hosted by the Virginia Tech Eastern Shore Agricultural Research and Extension Center (AREC) in Painter, VA (33446 Research Drive, Painter, VA). The event will begin at 6:00pm and the ticket cost will be $50/person. Each ticket will include all you can eat oysters and barbeque, and include beverages

FOR VENDORS/EXHIBITORS: You may purchase your Eastern Shore Ag Conference booth space along with your sponsorship and oyster roast tickets on our Destiny One websites: Sponsorship/Exhibit Space & Oyster Roast Tickets Please try and register as soon as you are able. Please make checks payable to VCE-Accomack and send to PO Box 60, Accomac, VA 23301. If you are mailing your payment, please be sure to include a copy of your application form or invoice.

*******For answers to your questions, please contact:***
Theresa Pittman - tpittman@vt.edu or Helene Doughty - hdoughty@vt.edu

WHAT'S THAT BUG?



Hélène Doughty, Northampton County Extension Agent, invites you to test your entomology knowledge. Take a guess on the pest and email her your answer! hdoughty@vt.edu

November's Answer: green peach aphids covering a broccoli leaf. Green peach aphids are tiny insects with piercing-sucking mouthparts and cause damage by removing fluids from the plant tissue. Presence of lady beetles on plants can often indicate that there is an aphid infestation. White specks on the plants are exuviae leftover from their molting process and are often more conspicuous than the aphids themselves (who blend well on the plant).

34th Annual

EASTERN SHORE AGRICULTURAL CONFERENCE AND TRADE SHOW

Exmore Moose Lodge, Belle Haven, VA

Wed, Jan 24th

General Session - 8:00 am

2024 Market Outlook - Mr. Robert Harper, VA Farm Bureau
Pesticide Legal Updates - VDACS Pesticide Services
Updates from the Eastern Shore AREC, Virginia Cooperative Extension, Virginia Tech, Virginia Department of Agriculture & the Governor's Office

Soybean Session - 1:00 pm

Cover Crops - Dr. Mark Reiter
Stink Bugs in Soybeans - Helene Doughty
Nematodes in Soybeans - Dr. David Langston
Tar Spot in Corn - Dr. Alyssa Koehler
Frog Eye Leaf Spot - Dr. David Langston

Potato Session - 1:00 pm

Updates from Potatoes USA - Blair Richardson
2024 Market Update - Brett Richardson
Potato Board Project Update: Weather Stations - Dr. Doug Higgins
Volunteer Potato Management - Sudeep Matthew

Thurs, Jan 25th

Vegetable Session - 8:30 am

Mulch Color in Tomato Production - Dr. Emmanuel Torres
Irrigation Management in Tomatoes - Dr. Emmanuel Torres
Sweet Corn Seed Treatments - Dr. Doug Higgins
Sweet Corn & Snap Bean Entomology - Helene Doughty
Snap Bean Fumigation - Dr. Doug Higgins

Agronomic Session - 8:30 am

Wheat Diseases - Dr. Doug Higgins
Wheat Varieties - Dr. Nicholas Santantonio
Cover Crops - Dr. Mark Reiter
Panel Discussion - to include cover crop seeding via drone, combine mounted seeders, and airplane seeding

DRONE DEMONSTRATION
Jan 25th - 1:00 pm

Don't Forget!

The Association of Eastern Virginia Agricultural Producers, Inc. will host a membership meeting on Thursday, January 25th at 11:00 am during the 2024 ES AG Conference

The Eastern Shore AREC and the Association of Eastern Virginia Agricultural Producers, Inc. will host the annual Ag Conference Oyster Roast. Get your Tickets BELOW!!

OYSTER ROAST TICKETS

Cover Crop Seeding via Air

Cover crops are a staple component of Eastern Shore production systems as we aim to improve soil quality, reduce nutrient movement, and increase overall crop system yields. Traditional methods for planting cover crops include drilling, spreading followed by shallow tillage, and aerial application via airplane. However, unmanned aerial vehicles (UAV) are quickly being adopted by industry to provide site specific aerial seeding applications. Aerial seeding by UAV is especially useful in smaller fields that are more difficult to spread via plane or in wet years when driving over fields is not suitable. Aerial seeding also allows a producer to seed cover crop species before late harvested crops, such as soybean, are removed from fields. Timely cover crop seeding is essential to ensure producers plant timely for various cost-share programs and to allow for adequate fall growth. Come hear more at the Eastern Shore Ag Conference and Trade Show regarding aerial seeding and to see a UAV demonstration.

Swift Aeroseed, LLC evaluating their experimental UAV on an Eastern Shore soybean field in October 2023.

An additional process needed prior to seeding cover crops via air is obtaining necessary flight clearances prior to working in the field.

New Associate Director of Virginia Agricultural Experiment Station

On November 29, Dr. Mary Burrows announced that Dr. Kang Xia is assuming the position of the Associate Director of the Virginia Agricultural Experiment Station. She has been serving in this role as interim since November 2022. She will continue her duties as the Director of the Center for Advanced Innovation in Agriculture.

Dr. Xia has been serving Virginia Tech since 2012 as a research and teaching faculty member in the School of Plant and Environmental Sciences. She has developed an internationally recognized environmental chemistry program focusing on environmental fate and impact of anthropogenic organic chemicals. She has presented 30 invited talks to local, state, national, and international audiences. She has authored or co-authored 80 peer-reviewed journal articles and book chapters and received >$12 million in grant funding. She was the recipient of the 2019 CALS Research Excellence Award and served as Associate Director for CAIA prior to her current role.

Welcome Dr. Xia!

Eastern Shore AREC Advisory Board Meeting

Thank you to all who attended our Fall 2023 Eastern Shore and Hampton Roads AREC Advisory Board meeting on November 30. We especially welcome our first visit from our new Director of Virginia Agricultural Experiment Station, Dr. Mary Burrows. Dr. Burrows toured the Eastern Shore AREC field and facilities and enjoyed an Eastern Shore style meal (crab cake, chicken salad, potatoes, snap beans, and roll) with AREC faculty, staff, and students.

Above: Andrew Fletcher and Dr. Mary Burrows discussing greenhouse facilities and temperature control at the AREC.

Left: Dr. Mary Burrows, faculty, and staff touring field research ongoing at the Eastern Shore AREC.

Eastern Shore Farmer Tries Chaff Lining to Defeat Weeds

by Claudio Rubione & Emily Unglesbee, GROW & Dr. Vijay Singh, ESAREC Weed Scientist

Third time is usually the charm, but it only took two tries for farmer Jarrett Sturgis to declare chaff lining a likely success on his operation near Eastville, Virginia, on the Eastern Shore. Chaff lining is the process of funneling chaff, where most weed seeds reside, into a narrow line behind the combine, where they are concentrated, easier to manage and less likely to thrive the following year.

Chaff lining is among the simplest forms of harvest weed seed control, as Sturgis demonstrated by assembling a home-made chaff lining chute, with help from Virginia Tech Weed Scientist Dr. Vijay Singh and his research team. The first prototype, made from scrap metal from Sturgis' farm, left much to be desired, as gaps in the construction allowed straw to mix with the chaff and shoot out the sides, producing more of a wide windrow than a narrow chaff line. But after mulling his design last winter, Sturgis and Dr. Singh added some flexible plastic shields and tried again. The result? A clean, two-foot wide chaff line that operated smoothly, with no effect on combine performance.

Sturgis ran the system successfully in soybeans and is planning to use it in wheat, where he hopes it will help manage his annual ryegrass problem. Watch the video below for more details:

FIGURE 1: Jarrett Sturgis (right) and Dr. Singh's (left) second draft of the chaff lining chute. (Photo credit: Claudio Rubione, GROW)

FIGURE 2: Sturgis's second chaff chute attempt produced a perfect, two-foot-wide chaff line behind his combine. (Photo credit: Claudio Rubione)

LEARN MORE ON YouTube

IF YOUR PRIVATE PESTICIDE LICENSE EXPIRES IN 2023...

Recertify with one of the following methods:

1. Attend the Eastern Shore Agricultural Conference on January 24th and 25th, 2024
2. Take the Online Private Pesticide Applicator Recertification Course
   a. VISIT THIS LINK: https://register.ext.vt.edu/search/publicCourseSearchDetails.do?method=load&courseId=1495024

VIRGINIA TECH CAREERS

Assistant Farm Manager. (Job no. 527895)

Join our team at the Virginia Tech Eastern Shore Agricultural Research and Extension Center in Painter, VA! The Assistant Farm Manger provides direct support and assistance to the Agricultural Farm Manager for managerial oversight of farm operations that includes research and general farming activities for crops important to the Eastern Shore that includes fresh market tomato, snap beans, potato, soybean, wheat, corn, among others. Experience growing and managing various vegetable, grain, and oilseed agricultural crops on a commercial basis for control of insects, disease, weeds, fertility, irrigation, etc. is mandatory. Application review will begin on January 5, 2024, and continue until a suitable candidate is found.. For more information and to apply online, visit: https://careers.pageuppeople.com/968/cw/en-us/job/521473/research-specialist-sr

Applied Entomology Extension Specialist. (Job no. 521473)

The Eastern Shore AREC seeks an Assistant Professor and Extension Specialist in Applied Entomology. The incumbent will focus on crops significant to Virginia's agricultural economy and important to the Eastern Shore and Coastal Plain regions of Virginia (potato, tomato, snap bean, broccoli, corn, soybean, wheat, and others). This is a 9-month, tenure track faculty position (50% research and 50% Extension). The candidate's tenure home will be within the Department of Entomology at Virginia Tech. Applicants are required to hold a PhD in entomology or a closely related discipline by the appointment start date. The candidate must have effective communication and interpersonal skills to collaborate with diverse teams and audiences, internal and external to the University. Packet review will begin on January 31, 2024, and continue until a suitable candidate is found. For more information and to apply online, visit: https://careers.pageuppeople.com/968/cw/en-us/job/521473/research-specialist-sr

NEW EXTENSION PUBLICATIONS AVAILABLE ONLINE

2023 Potato Variety Evaluation for the ESVA

2022 Potato Industry Status on the ESVA

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Virginia Cooperative Extension brings the resources of Virginia's land-grant universities, Virginia Tech and Virginia State University, to the people of the commonwealth. VCE provides education through programs in Agriculture and Natural Resources, Family and Consumer Sciences, 4-H Youth Development and Community Viability.

The Virginia Tech, Eastern Shore AREC is committed to supporting commercial vegetable, grain, oilseed, and fiber production throughout the Commonwealth of Virginia. Centrally located on Virginia's Eastern Shore, the center conducts basic and applied research on more than 25 agricultural crops.

ACRC®
AG CONTAINER RECYCLING COUNCIL

INSPECTION CHECKLIST

The ACRC program accepts containers when all of the conditions and actions listed below have been met:

- ☑ **Containers:** Only rigid high density polyethylene (HDPE) are accepted. Some HDPE containers have a thin barrier of other co-manufactured material that is acceptable. Containers will be embossed with resin code #2, and sometimes #7.

- ☑ **Use:** The container originally held an EPA registered pesticide labeled for biologicals, animal health, agriculture, forestry, vegetative management, specialty pest control OR a non-EPA registered crop protection adjuvant, crop oil, micronutrient, fertilizer, or surfactant

- ☑ **Professional Use:** The contents of each container were used by a farmer, commercial applicator or a person under the direct supervision of a farmer or commercial applicator.

- ☑ **Sizes:** Containers are accepted from the smallest sizes up to 55 gallons in capacity. For sizes greater than 55 gallons in capacity, contact your designated ACRC contractor. Scan the QR code below for more information.

- ☑ **Empty:** Containers must be empty to be recycled in the ACRC program. No dried on residue inside or outside the container, including the mouth of the container. Puncture the bottom of the container to insure no rinsate remains

- ☑ **Non-Acceptable Parts:** Cap removed and discarded. Caps and other non-HDPE parts, such as metal handles and rubber linings, cannot be recycled. Clean and discard these parts as normal solid waste. Never put a cap back on a rinsed container.

- ☑ **Clean:** Only properly rinsed containers will be accepted into the recycling program. Rinse the container 3 times or pressure rinse immediately after it is emptied. Containers are much easier to clean if rinsed immediately after use. Add the rinse water to the spray tank.

- ☑ **Inspected:** Immediately after rinsing the container, look inside and make sure that all the formulation has been rinsed out. Also, inspect the outside of the container; particularly check that the pour spout, the spout threads and the container wall surrounding the spout are free of formulation residues that flake, smear or come off on a glove when touched. The recycler cannot process containers that have removable formulation in or on them.

- ☑ **Stains:** Certain products discolor plastic with a penetrating stain. The stained containers are acceptable provided that no material can be smeared or removed when touched by a rubber glove.

- ☑ **Booklet/Label:** Booklets must be removed. The pressure sensitive label (base label) that adheres to the container may remain as some states require it to remain on the container.

- ☑ **Dry:** An acceptable container is a dry container. Store cleaned containers in an enclosed building or trailer or in plastic bags. The recycler will not accept a container that has liquid in it.

- ⊗ Containers that originally held consumer products, or home and garden pesticides are **NOT ACCEPTABLE.**

CLEAN means CLEAN
- INSIDE AND OUTSIDE -

ACRC Contractor Information

TRIPLE RINSED means TRIPLE RINSED
- NOT ONCE OR TWICE -

PO Box 1928, Apex, North Carolina 27502 | 877.952.2272 | info@agrecycling.org | agrecycling.org

ACRC is a non-profit organization whose purpose is to develop and support the collection and recycling of properly rinsed HDPE plastic crop protection, animal health, specialty pest control, micronutrient, biologicals, fertilizer, and adjuvant containers.

Compare your containers with the examples shown below.

ACRC® AG CONTAINER RECYCLING COUNCIL

Always follow the instructions on the label before handling any crop protection products. Wear the proper protective equipment as specified on the product label.

ACCEPTABLE

Container, thread, and lip are clean

Handle and neck stained but clean

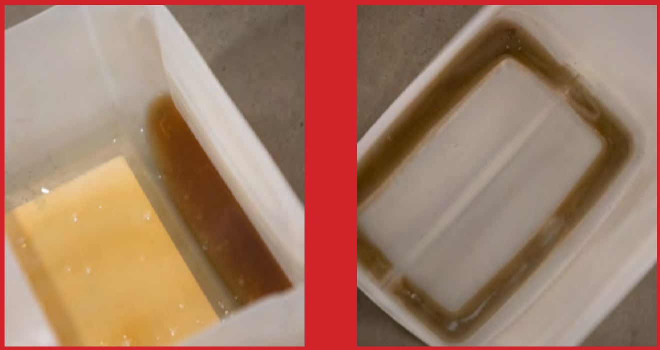
Inside stained but rinsed clean

Inside is clean and dry

NOT ACCEPTABLE

Dried formula on container

Dried formulation on thread



Liquid residue in container

Dried residue inside container

PO Box 1928, Apex, North Carolina 27502 | 877.952.2272 | info@agrecycling.org | agrecycling.org

ACRC is a non-profit organization whose purpose is to develop and support the collection and recycling of properly rinsed HDPE plastic crop protection, animal health, specialty pest control, micronutrient, biologicals, fertilizer, and adjuvant containers.

Rev 07/2023

2022 Potato Industry Status at the Eastern Shore of Virginia

Authored by Emmanuel Torres Quezada, Assistant Professor of Horticultural Cropping Systems and Extension Specialist, and Alexis Suero, Graduate Student, Eastern Shore Agricultural Research and Extension Center, Virginia Tech; Ursula Deitch, Domestic Marketing and Promotion, Virginia Department of Agriculture and Consumer Services; Theresa Long Pittman, Unit Coordinator and Extension Agent, Agriculture and Natural Resources, Virginia Cooperative Extension.

Potato history on the Eastern Shore

Potato (*Solanum tuberosum*) production on the Eastern Shore of Virginia has a rich history dating back to the 19th century. The Eastern Shore's sandy soils and moderate climate proved ideal for potato cultivation. Potatoes in Northampton County date back to 1845, a county that in time will hold the distinction of being the primary potato supplier for the entire United States (Northampton County, 2023). On the other hand, by the 1830s and 1840s, Accomack was a thriving agricultural county that was making the transition from staple crops to commercial vegetables. Sweet potato was the primary crop with the highest yields in 1840, with other important crops closely behind, such as Irish potatoes (Raynolds, 2017).

The Eastern Shore region significantly contributes to Virginia's potato production, accounting for a remarkable 80% of the state's total potato crops, solidifying its status as the largest potato production area in the Commonwealth. After the Civil War, improved transportation via steamboats, railroads, and trucks opened new markets for Eastern Shore farmers and fishermen. Despite its rural character, the Eastern Shore's economy had always been intertwined with the national market. Faced with competition from cheaper Midwestern grain, local farmers shifted from oats to fruits and vegetables, with potatoes emerging as a key crop (Northampton County, 2023).

By 1924, Eastern Shore farmers were harvesting close to 13,000,000 bushels (7,800,000 cwt) of Irish potatoes. In 1928, the Eastern Shore Produce Exchange alone required 23,000 railroad boxcars to transport the harvest. Achieving these remarkable yields involved mechanization, pesticide and fertilizer use, and a reduction in other crop acreage.

Nowadays, Virginia's potato farmers primarily focus on growing white potatoes intended for the fresh market and chip manufacturing. However, they also cultivate other varieties like red, russet, and gold potatoes to diversify their offerings (Northampton County, 2023).

The Importance of an Industry Assessment

Industry assessments offer vital insights into the current state of an agricultural system. They encompass critical aspects such as market trends, competitive dynamics, and growth prospects. These insights serve as valuable tools, empowering farmers, extension agents, and researchers to make informed decisions and formulate effective strategic plans. Moreover, these assessments play a pivotal role in stimulating research efforts and fostering innovation by identifying industry challenges, emerging trends, and stakeholder preferences.

Industry assessments also serve as crucial instruments for extension agents and researchers to improve their engaging methods with stakeholders, enhancing transparency in research endeavors, and cultivating trust with farmers. In 2022, researchers from the Eastern Shore Agricultural Research and Extension Center collaborated closely with extension agents from the Eastern Shore to conduct an IRB-approved survey on potato farmers in Virginia's Eastern Shore region. The primary objective was to develop an industry assessment that would provide valuable guidance for future research and extension initiatives, ultimately contributing to the advancement of the potato farming sector in the area.

2022 Industry Status

Potato farmers in the Eastern Shore planted an average of 2,095 acres in 2021 and 1,915 acres in 2022, resulting in an 8.6% reduction in the production area between years. Cultivar selection plays an essential role in the planning process for farmers each season. Nearly 75% of the farmers hand-picked their cultivars based on personal experience, while 12.5% prefer specific gravity as a selection parameter; the remaining farmers usually rely on seed companies' recommendations for selecting their cultivars each year.

By area, the most planted potato cultivars are 'Superior,' 'Arizona,' 'Envol,' 'Atlantic,' 'Snowden,' 'Columba,' 'Suraya,' 'Red Norland,' 'And Lija,' as well as a few proprietary clones from private companies dedicated to the production of potato chips. Nearly 87% of the farmers conduct a soil test before planting their crop; in some cases, soil fumigation is implemented, although many perceive this practice as economically inaccessible. Planting dates range between late February (February 20) and early April (April 7).

Planting rows are standardized to 36 inches, but in-row spacing tends to vary by the selected cultivar. For example, 'Superior' is usually planted 8 inches apart, 'Arizona' is planted at 9 inches, and 'Envol' at 10 inches of in-row spacing. In general, in-row spacing ranges between 8 and 11 inches.

All farmers include a pre- or at-planting application of dry fertilizer and conduct up to 2 more fertilizer applications during the season. Farmers might include a foliar fertilizer application to the plant or liquid formulations to the furrow if deemed necessary. Total applied N-P-K rates vary among farms and usually originate from the grower's experience and knowledge of each field. All farmers in the Eastern Shore have access to overhead irrigation. However, their irrigation regimen will primarily be determined by their personal experience with minimal support of technical tools or methods.

Farmers will drag off the crop one time in the season for weed control and cultivate (hilling) up to three times. Farmers will also monitor insects and diseases every week, with 85% of them reporting being “very confident” in identifying pests in their fields. Wireworms, Colorado Potato Beetles, and nematodes are the most common insect pests reported, while Early blight, Late blight, and Fusarium Dry Rot were also reported as challenging diseases.

Harvest time will vary by the selected cultivar and grower's preference, with the harvest season usually starting in the first week of June and the last few harvests happening by early August. Their harvest schedule is based on a combination of days after planting, market tendencies, tuber sizes (>2.5 inches), and skin set. On average, potatoes will stay in the ground between 110 and 130 days. About 75% of the farmers vine-kill their plants before harvest using Diquat dibromide. Marketable potato yield ranges between 150 and 250 cwt per acre.

Current Industry Challenges

In 2022, potato farmers reported fertilizer prices, labor availability, wireworms, market prices, excessive rainfall, and changing weather conditions as industry challenges with a high level of concern (above 8). Managing their fertilization and irrigation seems to be a mid-level concern for farmers, and not necessarily a priority. Similarly, disease management, such as Early and Late Blight, and Fusarium Dry Rot does not seem to be of real urgency compared to the rest of the subjects However, it is important to note that weather patterns and disease pressure from season to season can change drastically, which in turn could rapidly change farmers perspective (Figure 1).

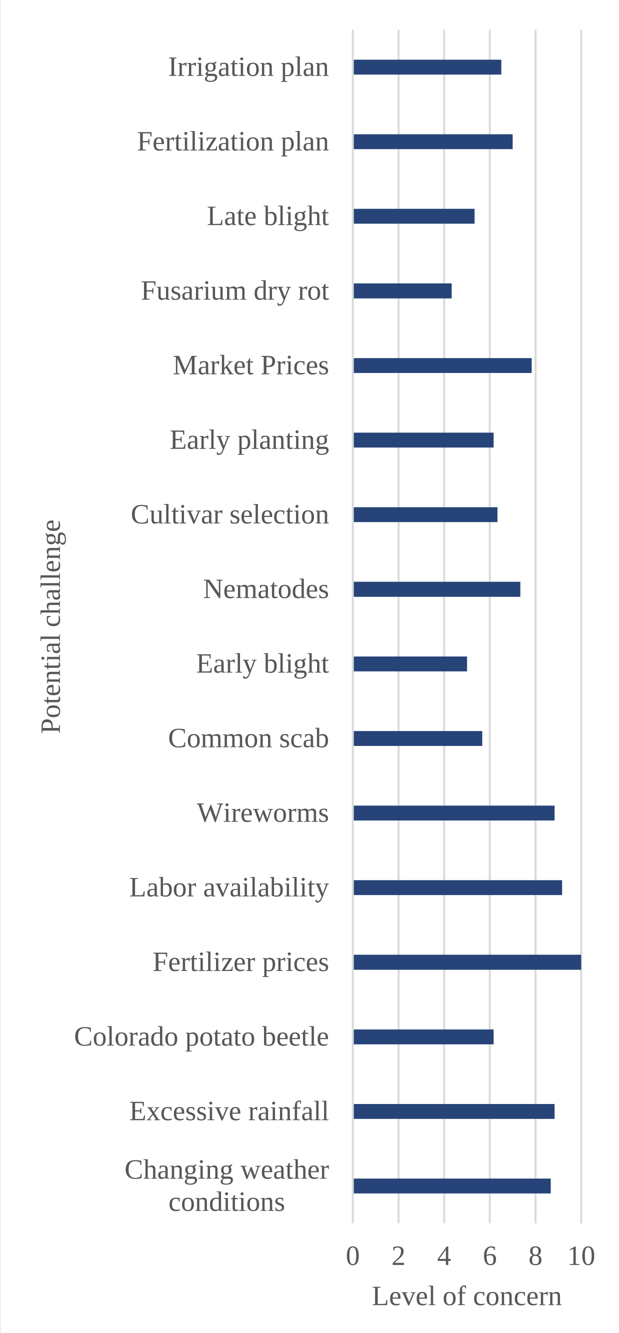


Figure 1. Challenges of the potato industry reported by farmers in 2022 in the Eastern Shore of Virginia

Horticultural Research Priorities

Potato farmers highlighted several areas of concern that merit attention and focus for research efforts. Soil analysis scheduling emerges as a top priority, with a concern level of 9.5 out of 10, indicating a critical need for timely and accurate soil assessment methods. This could play a pivotal role in enabling farmers to make informed decisions regarding fertilization and other soil management practices and could also be extended to further research focusing on holistic approaches to fertilization management. Accessibility to accurate weather data was also highlighted as a priority as it could provide support for immediate decisions regarding planting, irrigation, and harvesting. Additionally, soil water sensors and tensiometers followed in priority order, emphasizing the need for research in irrigation management (Figure 2). Although not mentioned in the survey, there is a common consensus among farmers about the importance of evaluating new potato varieties. Farmers understand that the current varieties work well for the Shore, but they also understand that breeding and testing takes time, and the efforts should be put in place promptly, in preparation for the future.

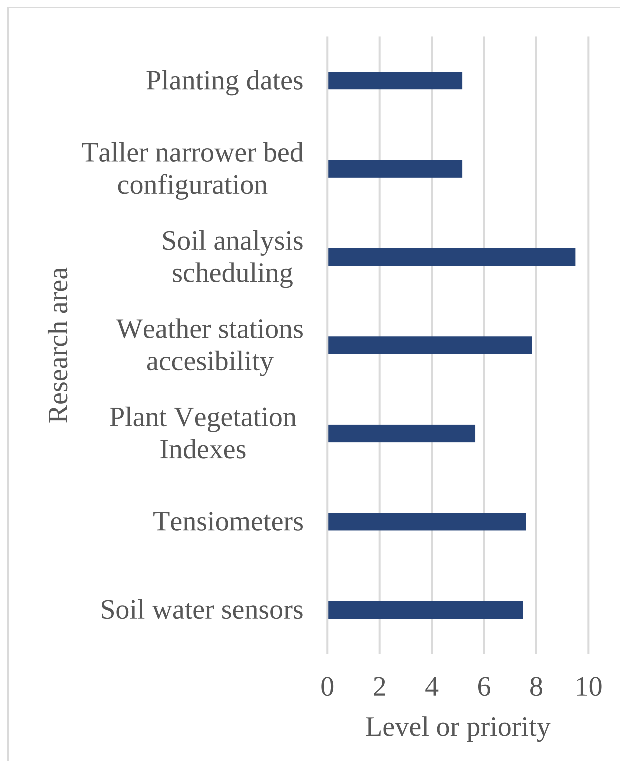


Figure 2. Potential areas of horticultural research suggested by potato farmers in 2022 at the Eastern Shore of Virginia

Communication preferences

Potato farmers exhibited a pronounced preference for email communication (8.7 out of 10), denoting the need for timely, direct, and informative communication in a digital format. Annual conferences also emerged as a notable preference, revealing a tendency towards interactive platforms where extensive information, networking, and discussions can occur. Personal communication was similarly valued, highlighting the importance of individualized and direct interactions. Conversely, other modes such as workshops, Facebook, and other social media platforms reflected lower levels of preference, indicating a reduced reliance on these mediums for acquiring information and updates (Figure 3). Overall, it seems potato farmers prefer personalized and interactive communication, although this could be achieved through digital means to ensure efficient and effective information exchange within the farming community in Eastern Shore of Virginia.

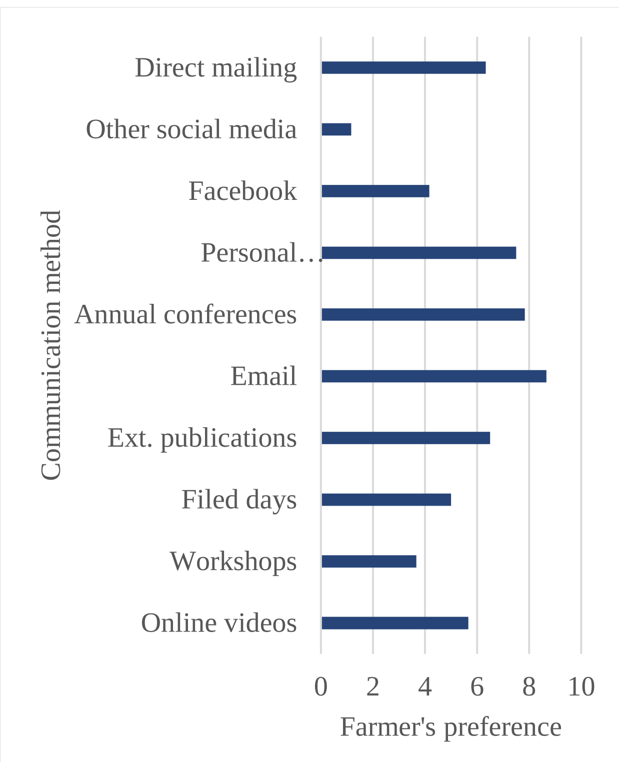


Figure 3. Preferred avenues of communication reported by potato farmers in 2022 at the Eastern Shore of Virginia

References

Northampton County. 2023. Potatoes. Available at: https://www.co.northampton.va.us/business/bountiful_northampton/agriculture/potatoes. Visited on Sept 29, 2023.

Raynolds, S.J. 2017. Historic Architectural Resource Survey, Eastern Shore, Accomack and Northampton Counties, Virginia. Available at: <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.dhr.virginia.gov/pdf_files/AC-081_Historic_AH_Survey_Eastern_Shore_2017_CRAI_report.pdf>. Visited on Sept. 30, 2023.

2023 SPES-522NP

2023 Potato Variety Evaluation for the Eastern Shore of Virginia

Authored by Emmanuel Torres-Quezada, Assistant Professor of Horticultural Cropping Systems and Extension Specialist, Alexis Suero Mirabal, Graduate Student, and Josue Alarcon Mendoza, Research Assistant, Eastern Shore Agricultural Research and Extension Center, Virginia Tech

Fundamentals of cultivar selection

Potatoes (*Solanum tuberosum*) have long been a staple crop in Eastern Virginia, contributing significantly to the region's agricultural economy and providing a valuable food source for both local and regional markets. Achieving high potato yields with excellent quality is a top priority for farmers and researchers alike. This critical objective is contingent on a combination of factors, with the selection of the right potato cultivar at the forefront. The choice of potato cultivar is a pivotal decision that can significantly influence the success of potato farming in Eastern Virginia. Different potato cultivars exhibit varying levels of adaptability to the region's unique climate, soil conditions, and disease pressures. These variations highlight the importance of selecting cultivars that are well-suited to the specific growing conditions of Virginia.

In accordance with the climate categorization devised by Wladimir Koppen and further enhanced by Glen Trewartha, Virginia experiences a "Mild mid-latitude" climate and falls within the subcategory of "Humid subtropical." It is designated as "Cfa" on the Koppen classification system due to its temperate nature, absence of a dry season, and hot summer conditions (Climate Data, 2023).

Cultivars must be carefully chosen to thrive in this environment, with consideration given to factors such as temperature fluctuations, precipitation patterns, and frost susceptibility. For example, cultivars with resistance to late blight, a common potato disease in the region, are highly desirable. Potatoes in this region are vulnerable to a range of pests and diseases, including beetles, nematodes, and fungal pathogens. Selecting cultivars with inherent resistance or tolerance to these threats can reduce the need for chemical interventions and promote sustainable farming practices.

Additionally, the soil composition in Eastern Virginia varies from sandy to loamy, and a correct assessment of a cultivar should consider soil drainage, fertility, and pH levels. Certain potato cultivars are better adapted to specific soil types, ensuring optimal nutrient uptake and root development.

Ultimately, the primary goal of potato cultivation is to achieve high yields, quality, and extended shelf life. The selection process should prioritize cultivars for their yield potential and consider their ability to produce quality tubers suitable for both fresh market and processing.

Evaluation Process

Before a new potato cultivar is released to farmers, it must undergo rigorous field evaluation. This process involves assessing the performance of the new cultivars by planting them in experimental plots under local conditions. During this process, several key aspects are examined:

Yield Potential

Field trials measure the yield of the new cultivars compared to established varieties under local production practices. This data is crucial in determining whether a cultivar is adequate for commercial production and includes yield per acre, average tuber side, and tuber quality parameters. Researchers also consider plant vegetative parameters in the evaluation process, as these data points are fundamental to making sense of the yield results and improving the specific production system for each cultivar. Data parameters often include germination percentage, Leaf Greenness, and Normalized Difference Vegetation Index.

Normalized Difference Vegetation Index (NDVI)

The NDVI provides valuable information about the health and vigor of vegetation, which is essential for making informed decisions in agricultural practices (GISGeography. 2023). Healthy vegetation reflects more near-infrared (NIR) and green light compared to other wavelengths. This is why our eyes see vegetation as green. However, if you could see near-infrared, then you would perceive a strong reflective red color as well. The NDVI compares the difference between the reflected NIR and the reflected red light. If a plant is healthy, it will reflect more NIR and absorb more red. The NDVI is designed to be highly precise to these changes in light, allowing us to detect differences between plants that would not be possible to detect just by looking at them with the naked eye. Additionally, it allows us to be consistent with our measures using a normalized scale, in this case, light reflection. NDVI value ranges are often interpreted as follows:

Low or Negative NDVI (-1 to 0): NDVI values close to zero or in the negative range typically represent non-vegetated or barren surfaces such as water bodies, urban areas, or bare soil.

Low to Moderate NDVI (0.1 to 0.2): These values may correspond to scarce or stressed vegetation, recently planted crops or areas with limited vegetation cover.

Moderate NDVI (0.21 to 0.5): This range often represents areas with some healthy vegetation cover but may include a mix of vegetation and non-vegetated surfaces.

High NDVI (0.51 to 0.8+): NDVI values in this range are typically associated with healthy and dense vegetation. The higher the NDVI value within this range, the more robust and vigorous the vegetation. It's important to note that the specific threshold values for what is considered "adequate" or "healthy" NDVI can vary depending on the vegetation type, region, and the goals of the analysis (GISGeography. 2023).

Leaf Greenness (SPAD)

SPAD (Soil-Plant Analysis Development) is a non-destructive method used to measure the greenness or chlorophyll content in plant leaves. It is a widely used tool in agriculture, horticulture, and plant science to assess the health and nutritional status of plants. The SPAD meter, also known as a chlorophyll meter, is a handheld device that provides a quantitative measurement of chlorophyll concentration in leaves (Xiong et al., 2015).

General guidelines for SPAD values in potato plants can vary in accordance with the crop stage.

Early Growth Stage (Vegetative Stage): During the early vegetative growth stage, SPAD values for healthy potato plants typically fall in the range of 30 to 60. This range may vary slightly depending on factors like soil fertility and the specific potato variety being grown.

Mid-Growth Stage (Tuber Initiation and Development): As the potato plants transition to the stage of tuber initiation and development, SPAD values may continue to increase. SPAD values in the range of 40 to 70 are often considered adequate for this stage.

Late Growth Stage (Maturity): As potato plants approach maturity and the tubers develop, SPAD values can vary widely. SPAD values between 40 and 80 or higher are common during the late growth stage, depending on factors like variety and local conditions.

Variety-Specific Differences: Different potato varieties may have slightly different SPAD value ranges that are considered adequate. Some varieties naturally have higher chlorophyll content and may have higher SPAD values throughout their growth cycle.

Specific Gravity

Specific gravity in potatoes is a measure of the density or weight of potato tubers relative to the density of water. It is an important quality parameter used to assess the starch content and cooking characteristics of potatoes, especially for processing purposes. Specific gravity is typically expressed as a dimensionless number and is sometimes referred to as potato gravity or potato starch content (Wilson and Lindsay. 1969).

Specific gravity in potatoes is determined by comparing the weight of a potato sample to the weight of an equal volume of water. This is usually done by weighing the potato sample both in the air and while submerged in water. The specific gravity is calculated using the formula:

Specific Gravity (SG) = Weight in Air / (Weight in Air - Weight in Water)

The ideal specific gravity range can vary depending on the specific requirements of the processing industry, but it often falls between 1.070 and 1.080 for optimal processing quality. Potatoes falling within this range are considered suitable for processing into high-quality products (Wilson and Lindsay. 1969).

Snack Food Association (SFA) chip color measurement standard

The SFA (Snack Food Association) chip color measurement standard plays a significant role in assessing the quality of chips following the frying process. On this scale, a lighter color (assigned a score of 1.0) is highly sought after, while a darker color (scored at 5.0) is deemed unacceptable (Figure 1, Wayumba, 2019). A value of 2.5 or higher is considered not acceptable for commercial processing.

Brown Center (BC)

Brown center in potatoes is a quality issue that affects the internal appearance of the potato tuber. It is characterized by the presence of a brown or dark-colored region in the center of the potato, which contrasts with the normally white or cream-colored flesh. This browning typically occurs due to enzymatic and chemical reactions within the potato tuber and is associated with specific conditions and practices during potato growth and storage (Zotarelli et al., 2012).

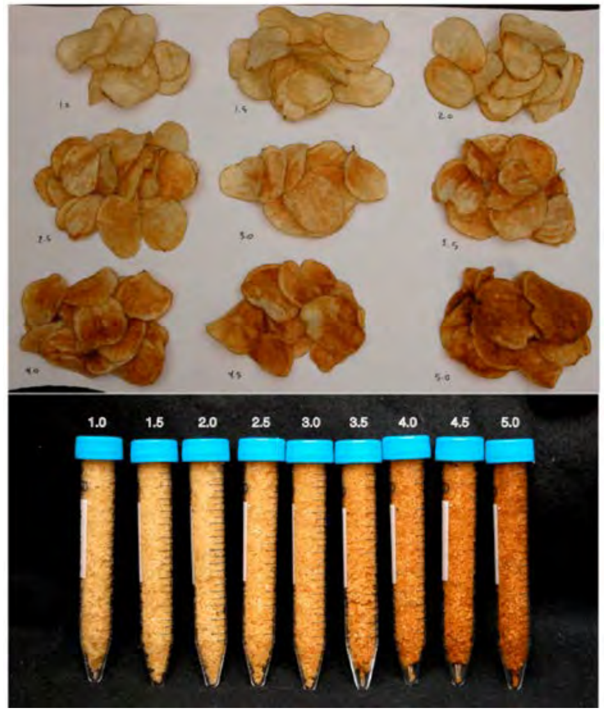


Figure 1. Snack Food Association (SFA) chip color standard. (Wayumba, 2019).

Hollow Heart (HH)

Hollow heart is a common physiological disorder that can occur in potatoes. It is characterized by the presence of hollow cavities or air pockets in the center of the potato tuber, typically running lengthwise. These cavities can vary in size and shape and may be accompanied by brown or discolored tissue surrounding the hollow area (Department of Primary Industries and Regional Development. 2016). Hollow heart is not caused by disease or pests but is instead a result of irregular growth and development within the potato tuber. Certain potato varieties are more prone to hollow hearts than others, as some varieties have a genetic predisposition to this disorder.

Vascular Ring Discoloration (VRD)

Vascular ring discoloration in potatoes is a physiological disorder that affects the internal quality of potato tubers. It is characterized by the presence of brown or dark-colored rings or streaks that develop within the vascular tissue of the potato tuber. These rings or streaks are usually arranged in concentric circles, resembling the growth rings of a tree. VRD typically occurs in the tuber's vascular system, which includes the phloem and xylem tissues responsible for transporting nutrients and water throughout the plant (University of Nebraska – Lincoln, 2023).

2023 Cultivar Evaluation

A total of 21 potato clones were evaluated at the Eastern Shore Agricultural Research and Extension Center in 2023. Experimental plots were established in a Completely Randomized Block Design with 4 replications. 40 plants per plot, in 30-ft long plots. Plants were distributed in a single row with 9 inches of in-row spacing. Potatoes were planted on March 17 and fertilized with 60 lb/A of 10-10-10. During the planting process, potato seeds were treated with Quadris + Ridomil gold (6 oz/A), and Platinum 75 SG (2.67 oz/A). Plants received a total of 180 lb/A of nitrogen, 43.7 lb/A of P_2O_5, and 166 lb/A of K_2O. Additionally, the crop received an average of 2 inches of water per week, starting the third week after planting and finishing a week before desiccation. Plants were cultivated during the first week of April and treated with Boundry 6.5EC, for weed control. A second herbicide application was done on April 18 (TriCor™ DF + Dual II Magnum). On May 23, plants received a foliar fungicide application of Ridomil Gold MZ, (2.5 lb/A), and on July 11, plants were desiccated using a foliar application of Reglone (2 pts/A). Potatoes were harvested on August 02. Figure 2 shows the average, minimum, and maximum temperature and daily rainfall at the experimental site during the evaluation.

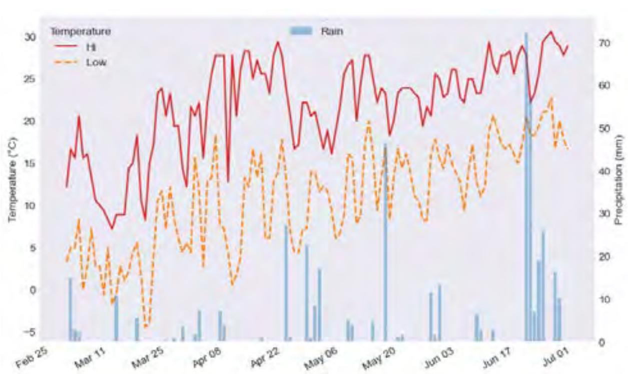
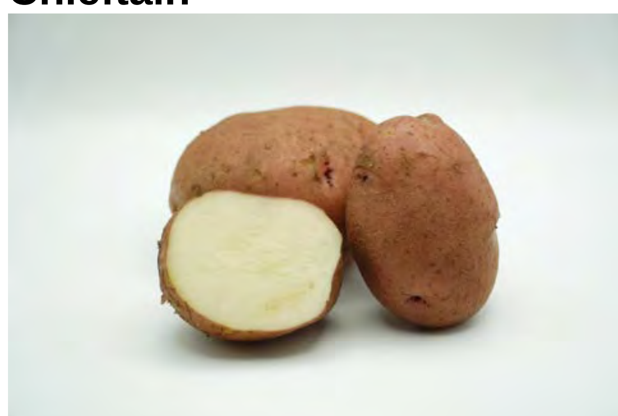


Figure 2. Maximum, minimum, and average air temperatures and rainfall at the Eastern Shore Agricultural Research and Extension Center, between March and early July, at Painter, VA.

Atlantic

The germination percentage of cultivar ‘Atlantic’ was 84.3% at 30 days, and 93.1% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 50.9, 49.1, and 32.9, respectively. Plant NDVI was 0.60 at 6 weeks, 0.84 at 8 weeks, and 0.76 at 10 weeks. Plants produced an average of 189.8 CWT per acre, with an average tuber weight of 105.1 grams. Specific gravity was 1.094 with an SFA score of 3.5, with 20% HH, 10% BC, and 0% VRD.

Chieftain



The germination percentage of cultivar ‘Chieftain’ was 88.1% at 30 days, and 91.3% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 56.5, 49.7, and 29.9, respectively. Plant NDVI was 0.58 at 6 weeks, 0.84 at 8 weeks, and 0.76 at 10 weeks. Plants produced an average of 179.4 CWT per acre, with an average tuber weight of 95 grams. Specific gravity was 1.071 with an SFA score of 3.5, with 0% HH, 0% BC, and 0% VRD.

Katahdin

The germination percentage of cultivar 'Katahdin' was 68.8% at 30 days, and 82.5% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 51, 47.9, and 37.1, respectively. Plant NDVI was 0.55 at 6 weeks, 0.84 at 8 weeks, and 0.75 at 10 weeks. Plants produced an average of 149 CWT per acre, with an average tuber weight of 93 grams. Specific gravity was 1.078 with an SFA score of 4, with 0% HH, 0% BC, and 0% VRD.

Russet Norkotah

The germination percentage of the cultivar 'Russet Norkotah' was 79.4% at 30 days, and 94.4% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 55.6, 48.5, and 30.4, respectively. Plant NDVI was 0.52 at 6 weeks, 0.84 at 8 weeks, and 0.78 at 10 weeks. Plants produced an average of 195.4 CWT per acre, with an average tuber weight of 89.6 grams. Specific gravity was 1.084 with an SFA score of 5, with 0% HH, 0% BC, and 0% VRD.

Kennebec

The germination percentage of cultivar 'Kennebec' was 79.4% at 30 days, and 89.4% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 53.7, 46.9, and 30.7, respectively. Plant NDVI was 0.58 at 6 weeks, 0.85 at 8 weeks, and 0.78 at 10 weeks. Plants produced an average of 170.9 CWT per acre, with an average tuber weight of 117.2 grams. Specific gravity was 1.078 with an SFA score of 4.5, with 10% HH, 0% BC, and 0% VRD.

Snowden

The germination percentage of cultivar 'Snowden' was 95.2% at 30 days, and 96.2% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 48.9, 44.8, and 30.3, respectively. Plant NDVI was 0.58 at 6 weeks, 0.85 at 8 weeks, and 0.77 at 10 weeks. Plants produced an average of 192.1 CWT per acre, with an average tuber weight of 74.1 grams. Specific gravity was 1.089 with an SFA score of 5, with 0% HH, 0% BC, and 0% VRD.

Superior

The germination percentage of cultivar 'Superior' was 87.5% at 30 days, and 91.2% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 53.7, 50.9, and 32.2, respectively. Plant NDVI was 0.57 at 6 weeks, 0.83 at 8 weeks, and 0.75 at 10 weeks. Plants produced an average of 196.3 CWT per acre, with an average tuber weight of 101.3 grams. Specific gravity was 1.086 with an SFA score of 5, with 0% HH, 0% BC, and 10% VRD.

AF5735-8

The germination percentage of cultivar 'AF5735-8' was 86.9% at 30 days, and 95.6% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 50.9, 49.7, and 32.8, respectively. Plant NDVI was 0.55 at 6 weeks, 0.85 at 8 weeks, and 0.77 at 10 weeks. Plants produced an average of 125.5 CWT per acre, with an average tuber weight of 98.6 grams. Specific gravity was 1.081 with an SFA score of 5, with 0% HH, 0% BC, and 0% VRD.

AF5521-1

The germination percentage of cultivar 'AF5521-1' was 66.2% at 30 days, and 95% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 52.2, 51.8, and 32.1, respectively. Plant NDVI was 0.57 at 6 weeks, 0.84 at 8 weeks, and 0.75 at 10 weeks. Plants produced an average of 182.2 CWT per acre, with an average tuber weight of 121.5 grams. Specific gravity was 1.092 with an SFA score of 4, with 0% HH, 10% BC, and 0% VRD.

AF5933-4

The germination percentage of cultivar 'AF5933-4' was 78.8% at 30 days, and 88.1% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 52.9, 52.5, and 31.7, respectively. Plant NDVI was 0.57 at 6 weeks, 0.85 at 8 weeks, and 0.78 at 10 weeks. Plants produced an average of 192.9 CWT per acre, with an average tuber weight of 80.8 grams. Specific gravity was 1.094 with an SFA score of 5, with 10% HH, 0% BC, and 0% VRD.

AF6194-4

The germination percentage of cultivar 'AF6194-4' was 75% at 30 days, and 86.9% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 49.2, 48.1, and 31.7, respectively. Plant NDVI was 0.54 at 6 weeks, 0.85 at 8 weeks, and 0.77 at 10 weeks. Plants produced an average of 203.9 CWT per acre, with an average tuber weight of 108.6 grams. Specific gravity was 1.084 with an SFA score of 3, with 10% HH, 0% BC, and 0% VRD.

AF6340-6

The germination percentage of cultivar 'AF6340-6' was 88.8% at 30 days, and 96.9% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 54.4, 48.1, and 27.3, respectively Plant NDVI was 0.60 at 6 weeks, 0.85 at 8 weeks, and 0.78 at 10 weeks. Plants produced an average of 200.3 CWT per acre, with an average tuber weight of 79.3 grams. Specific gravity was 1.079 with an SFA score of 5, with 0% HH, 0% BC, and 0% VRD.

AF6565-8

The germination percentage of cultivar 'AF6565-8' was 71.2% at 30 days, and 84.4% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 55.9, 48.9, and 32.8, respectively. Plant NDVI was 0.57 at 6 weeks, 0.84 at 8 weeks, and 0.76 at 10 weeks. Plants produced an average of 193.3 CWT per acre, with an average tuber weight of 88.3 grams. Specific gravity was 1.091 with an SFA score of 3, with 10% HH, 0% BC, and 0% VRD.

AF6601-2

The germination percentage of cultivar 'AF6601-2' was 83.7% at 30 days, and 92.5% at 45 days after planting. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 50.4, 43.9, and 26.9, respectively. Plant NDVI was 0.56 at 6 weeks, 0.84 at 8 weeks, and 0.75 at 10 weeks. Plants produced an average of 166.9 CWT per acre, with an average tuber weight of 74.4 grams. Specific gravity was 1.089 with an SFA score of 3.5, with 0% HH, 0% BC, and 0% VRD.

BNC559-1

The germination percentage of cultivar 'BNC559-1' was 75% at 30 days, and 85.6% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 55.9, 52.5, and 37.2, respectively. Plant NDVI was 0.55 at 6 weeks, 0.83 at 8 weeks, and 0.73 at 10 weeks. Plants produced an average of 146.9 CWT per acre, with an average tuber weight of 91 grams. Specific gravity was 1.075 with an SFA score of 3.5, with 0% HH, 0% BC, and 0% VRD.

BNC917-2

The germination percentage of cultivar 'BNC917-2' was 76.9% at 30 days, and 84.4% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 53.1, 47.6, and 31.7, respectively. Plant NDVI was 0.56 at 6 weeks, 0.84 at 8 weeks, and 0.76 at 10 weeks. Plants produced an average of 177.1 CWT per acre, with an average tuber weight of 95.5 grams. Specific gravity was 1.073 with an SFA score of 4, with 10% HH, 0% BC, and 0% VRD.

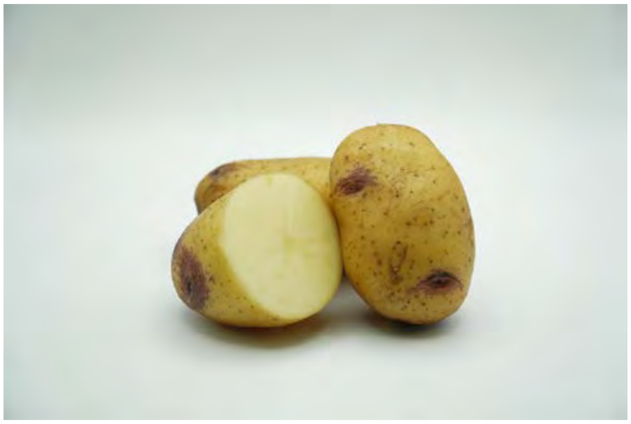
MSAFFB635-15

The germination percentage of cultivar 'MSAFFB635-15' was 68.1% at 30 days, and 79.4% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 54.7, 52.6, and 42.8, respectively. Plant NDVI was 0.53 at 6 weeks, 0.83 at 8 weeks, and 0.71 at 10 weeks. Plants produced an average of 161.5 CWT per acre, with an average tuber weight of 82.7 grams. Specific gravity was 1.089 with an SFA score of 4, with 10% HH, 0% BC, and 0% VRD.

NDAF141Y-3

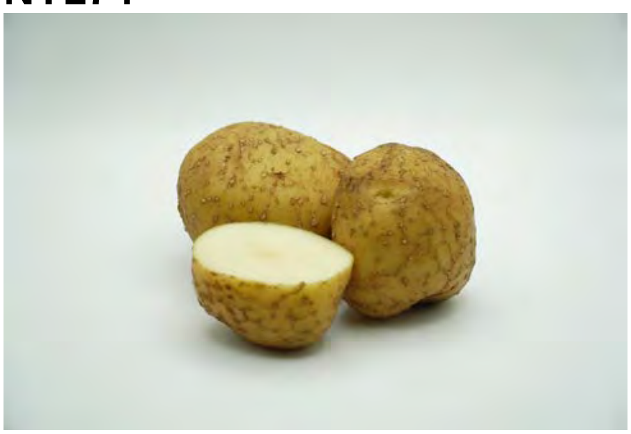
The germination percentage of cultivar 'NDAF141Y-3' was 81.2% at 30 days, and 87.5% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 50.6, 51.8, and 32.74, respectively. Plant NDVI was 0.57 at 6 weeks, 0.84 at 8 weeks, and 0.77 at 10 weeks. Plants produced an average of 156.3 CWT per acre, with an average tuber weight of 90.3 grams. Specific gravity was 1.078 with an SFA score of 4.5, with 0% HH, 0% BC, and 0% VRD.

NY171



The germination percentage of cultivar ‘NY171’ was 71.9% at 30 days, and 85% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 49.4, 46.3, and 31.9, respectively. Plant NDVI was 0.53 at 6 weeks, 0.83 at 8 weeks, and 0.76 at 10 weeks. Plants produced an average of 113.6 CWT per acre, with an average tuber weight of 103.5 grams. Specific gravity was 1.076 with an SFA score of 4, with 0% HH, 0% BC, and 0% VRD.

NY174



The germination percentage of cultivar ‘NY174’ was 81.9% at 30 days, and 92.5% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 54.5, 51.6, and 36.7, respectively. Plant NDVI was 0.53 at 6 weeks, 0.83 at 8 weeks, and 0.73 at 10 weeks. Plants produced an average of 206.8 CWT per acre, with an average tuber weight of 104.9 grams. Specific gravity was 1.086 with an SFA score of 3. Potatoes showed 0% hollow heart, 0% brown center, and 0% vascular ring discoloration.

NY177

The germination percentage of cultivar ‘NY177’ was 62.5% at 30 days, and 68.1% at 45 days. The average Leaf Greenness at 4, 8, and 12 weeks after planting was 49.8, 47.8, and 38.1, respectively. Plant NDVI was 0.56 at 6 weeks, 0.84 at 8 weeks, and 0.75 at 10 weeks. Plants produced an average of 153 CWT per acre, with an average tuber weight of 96.2 grams. Specific gravity was 1.092 with an SFA score of 3.5. Potatoes showed 0% hollow heart, 0% brown center, and 0% vascular ring discoloration.

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Summary of Normalized Difference Vegetation Index, Leaf Greenness (SPAD), Specific Gravity, and Yield per cultivar during the 2023 potato season at the Eastern Shore Agricultural Research and Extension Center, at Painter, VA.

Cultivar	NDVI weeks after planting					SPAD weeks after planting			Specific Gravity	Yield (cwt/acre)
	6	8	10	12	14	4	8	12		
Atlantic	0.60	0.85	0.77	0.77	0.61	51.0	49.1	32.9	1.094	204.9
Chieftain	0.58	0.84	0.76	0.77	0.61	56.5	49.8	30.0	1.071	198.4
Katahdin	0.55	0.84	0.75	0.77	0.60	51.0	47.9	37.1	1.078	184.2
Kennebec	0.58	0.85	0.78	0.79	0.64	53.8	46.9	30.7	1.078	190.7
Russet Norkotah	0.53	0.85	0.78	0.80	0.62	55.6	48.5	30.4	1.084	206.6
Snowden	0.59	0.85	0.78	0.74	0.55	48.9	44.8	30.4	1.089	200.1
Superior	0.58	0.84	0.75	0.75	0.58	53.7	51.0	32.2	1.086	215.0
AF5521-1	0.57	0.84	0.75	0.78	0.67	52.2	51.9	32.1	1.092	192.5
AF5735-8	0.55	0.85	0.77	0.77	0.59	50.9	49.7	32.8	1.081	130.9
AF5933-4	0.57	0.86	0.79	0.79	0.64	52.9	52.5	31.7	1.094	219.0
AF6194-4	0.55	0.85	0.77	0.78	0.66	49.2	48.1	31.7	1.084	230.0
AF6340-6	0.60	0.85	0.78	0.78	0.60	54.5	47.9	27.3	1.079	207.6
AF6565-8	0.57	0.84	0.77	0.77	0.63	55.9	48.9	32.8	1.091	228.8
AF6601-2	0.57	0.85	0.75	0.75	0.58	50.4	44.0	27.0	1.089	181.4
BNC559-1	0.56	0.84	0.74	0.77	0.62	55.9	52.5	37.2	1.075	169.9
BNC917-2	0.56	0.84	0.76	0.76	0.61	53.1	47.6	31.7	1.073	211.1
MSAFFB635-15	0.53	0.83	0.72	0.75	0.60	54.7	52.6	42.8	1.089	208.5
NDAF141Y-3	0.58	0.85	0.78	0.79	0.63	50.6	51.8	32.7	1.078	186.6
NY171	0.54	0.84	0.76	0.76	0.61	47.6	44.5	30.8	1.076	136.7
NY174	0.57	0.84	0.76	0.78	0.66	54.6	51.6	36.7	1.086	223.1
NY17	0.54	0.84	0.74	0.77	0.67	49.8	47.8	38.0	1.092	225.5

Green: Yield over 200 cwt/acre; red: yield under 150 cwt/acre

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