



Feb 2019

Agricultural Research Partnerships (ARP) Network NOTES

Welcome to ARP Network Quarterly Notes! Our goal is to keep you informed about ARP Network and Agricultural Research Service's current information. We hope that the notes build networking opportunities for businesses to connect with ARP Network Members.

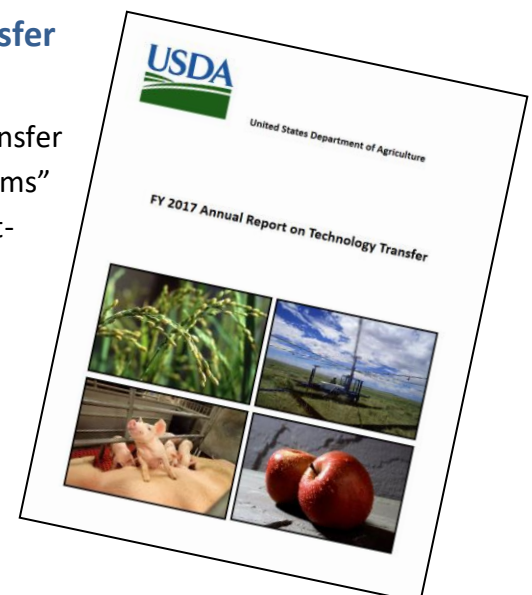
Please help us spread the word by sharing ARP Network Notes with your company contacts, colleagues, other organizations, etc. Thank you!

ARP Network

The ARP Network enlists the help of partners to spark economic development, entrepreneurship and community development. USDA ARS founded the ARP Network to expand the impact of ARS research and provide resources to help companies grow. By combining ARS research expertise with complementary capabilities and talents of partnering organizations, the ARP Network helps stimulate economic growth through technological advancements. The ARP Network matches business needs with ARS innovations and research capabilities and provides business assistant services to help companies and startups solve agricultural problems, develop products and create new jobs. Learn more by visiting us on LinkedIn: <https://www.linkedin.com/in/agricultural-research-partnerships-arp-network-3863a8147>

USDA ARS 2017 Annual Report on Technology Transfer

USDA research generated 166 new inventions and 68 patent applications in 2017, according to the annual Technology Transfer Report issued today. Innovations included tornado "safe rooms" built of cross-laminated wood, soybean germplasm with heat-tolerant genes, and tires of rubber made from a flowering desert shrub. The annual Technology Transfer Report lists technology produced through research either conducted or supported by USDA.

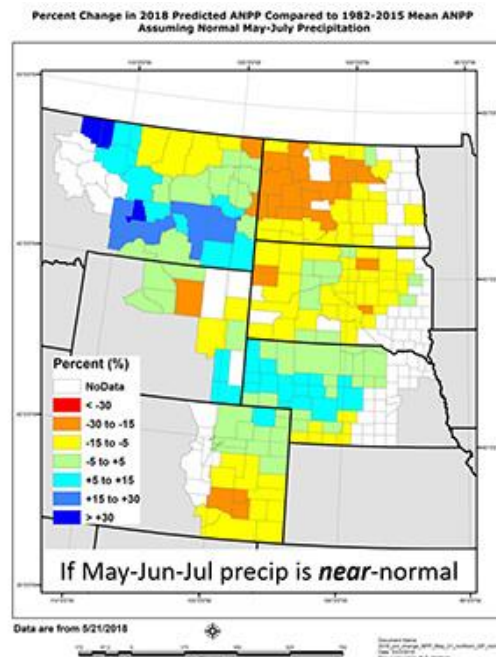


“USDA research not only improves agriculture, but it also creates business opportunities and jobs through innovations affecting all areas of daily life,” said Dr. Chavonda Jacobs-Young, USDA Acting Deputy Under Secretary for Research, Education, and Economics “This report illustrates why studies show that every dollar invested in agricultural research returns \$20 to our economy.”

The 434-page report tracks information, tools, and solutions developed through USDA’s agricultural research efforts, including collaborative partnerships with the private sector, and formal Cooperative Research and Development Agreements. The innovations outlined in the report show how these efforts have translated into public-private partnerships that help American agriculture and other businesses compete in the world marketplace. Click [here](#) to read full report that is available.

Grass Cast: Grass Land Productivity Forecast

Grass-Cast is a USDA ARS rangeland grazing forecast system that can predict, for example, if May, June and July precipitation is near normal in southeastern Colorado, the counties will be expected to have 5 to 15 percent fewer pounds per vegetation acre than their 34-year average. Grass-Cast publishes updated forecasts every two weeks to help producers in the Northern Great Plains reduce this economically important source of uncertainty. Watch for updates on the Grass-Cast website, on the USDA Northern Plains Climate Hub’s website, or on Twitter (@PeckAgEc). To learn more click [here](#).



ARS Partnership and/or Licensing Opportunities

ARS is looking for industry partners interested in commercializing these technologies and/or evaluating them for potential commercial applications through a Cooperative Research and Development Agreement (CRADA). Many of these technologies are also available for licensing.

Advancing Tick-Borne Disease Diagnostics

Ticks and tick-borne diseases kill humans and animals. Enhanced pathogen detection is needed to improve the diagnosis of these diseases. The TickPath Layerplex is an



innovative quantitative PCR (qPCR) assay to detect several tick-borne pathogens simultaneously. This assay aids in the diagnosis and treatment of human and animal tick-borne diseases.

Benefits

- Detects several groups of tick-borne pathogens in a sample simultaneously
- Distinguishes type of tick-borne pathogen in the sample simultaneously
- Guides decision for rapid and appropriate treatment
- Results obtained faster than with other types of assays

Applications

- Use during or after treatment of some tick-borne diseases as serologic titers can be persistent despite proper treatment of infection
- Replace serologic titer assays which are unable to determine if an active infection is occurring
- Can assay whole tick, tick fluid and serum from dogs, cats, cattle, etc.

ARS Docket no. 68.16. Please contact Jeff Walenta: jeffrey.walenta@ars.usda.gov

Methods of Attracting *Drosophila Suzukii*

A Method of attracting *Drosophila suzukii*, involving treating an object or area with a chemical attractant composition based on volatiles that attract *Drosophila suzukii*.

Benefits

- The compound is a synthetic natural attractant based on fruits
- The method provides a means of early detection and population monitoring of *Drosophila suzukii*

Applications

- Infestation detection and monitoring
- Could potentially enable future development of mass trapping and mating disruption technologies for managing this pest

ARS Docket No. 148.18. Please contact Jim Poulos: jim.poulos@ars.usda.gov



Planar Transmission-Line Permittivity Sensor and Calibration Method for the Characterization of Liquids, Powders and Semisolid Materials

A planar transmission line sensor apparatus and calibration method for measuring the complex permittivity of liquids, powders, and semisolid materials over a wide band of radio and microwave-frequency. The sensor is also used for measuring the anisotropic dielectric properties of materials.

Benefits

- Quantitative and sensitive test
- Results obtained in 3 - 6 hours instead of days or weeks
- Rapid, nondestructive, wideband permittivity measurements of materials, especially those without uniform edges and without the need to have the material perpendicular to the planar line by using a planar transmission-line sensor
- Simple calibration procedure
- Low cost planar transmission-line sensor apparatus

Applications

- Measuring attributes of products such as moisture content, fat content in agricultural products and food, lumber, chemical, pharmaceutical, concrete, and construction industries
- Poultry and meat processing plants

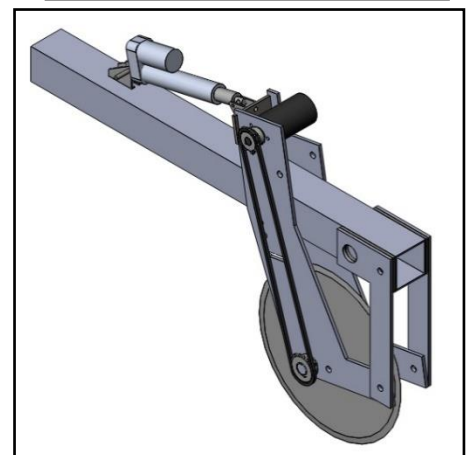
ARS Docket nos. 8.19 & 202.13. Please contact Joe Lipovsky: joe.lipovsky@ars.usda.gov

Modular Cutting Device for Cover Crop Residue

A modular cutting device for cover crop residue can improve planting quality in both row crop and vegetable no-till farming systems. Eliminates interference with planting unit by cleanly cutting through heavy surface residue utilizing higher RPM of the cutting disk compared to RPM obtained through free rotation (friction with soil) for traditional coulters. This versatile and compact modular design allows retrofitting of current commercially-available planting equipment for different planting configurations.

Benefits

- Provides effective and clean cutting of heavy cover crop residue for better quality planting cash crops directly into cover crop residue
- Modular design to allow different mounting configurations and available power sources such as mechanical, hydraulic and electric
- Vastly improved cutting effectiveness of cover crop residue over traditional cutting coulters especially in weight-limited small farm applications



Applications

- For use in heavy cover cropping systems where tradition cutting coulters are less effective. This device can be adapted to any no-till planting system and equipment size

ARS Docket no. 131.18. Please contact Joe Lipovsky: joe.lipovsky@ars.usda.gov

In-Row Rotary Cultivator

A hydraulically-driven rotary weeder for in-row cultivation of vineyards and other crops grown on a berm. This cultivator is especially useful for the removal of weeds in and around grapevines without major disruption of vine trunks and berms. It is also useful in wine grape production where certain herbicides such as glyphosate are prohibited. ARS researchers have developed a prototype that is about 90% complete; and are looking for a company to field test, manufacture and distribute the cultivator.



Benefits

- Eliminates the use of herbicides while maintaining weed-free berm
- Provides weed control on berms where organic crops are grown
- May be used on a variety of bermed crops where weed-free zones are desired

Applications

- May be used in and around a variety of crops grown on berms where a weed-free zone in between and around plants is desired. Rotary cultivator can be used with an existing tractor hydraulic system, or a remote oil tank can be used

ARS Docket no. 17.09. Please contact David Nicholson: david.nicholson@ars.usda.gov

X-ray Based Irradiation Units

This technology incorporates the use of x-ray tube-based irradiators as alternatives to gamma sources for laboratory scale irradiation. Irradiators are designed with sample placement in closest possible



proximity to the source, allowing high dose rates for small samples. Designs using 1000 Watt x-ray tubes in single tube, double tube, and four tube configurations have been developed, as well as various cabinet construction techniques. Relatively high dose rates can be achieved for small samples, demonstrating feasibility for laboratory-based irradiators for research purposes. Dose rates of 9.76, 5.45, and 1.7 Gy/min/tube were measured at the center of a 12.7 cm container of instant rice at 100 keV, 70 keV, and 40 keV, respectively. For 2.54 cm diameter sample containers containing adult Navel Orangeworm, dose rates of 50–60 Gy/min were measured using a four-tube system.

Benefits

- X-ray results in consistent dose over time whereas radioactive decay results in continuously reducing dose over time, eventually requiring replacement of the source
- X-rays do not produce nuclear waste like gamma rays
- X-ray source requires less shielding than gamma sources
- Gamma sources are “always on” while x-rays turn off
- X-ray is subject to less regulation than gamma sources

Applications

- Irradiation of seeds to prevent sprouting
- Treatment for insect control (Plant Health)
- Control of bacteria (Food Irradiation)
- Insect sterilization

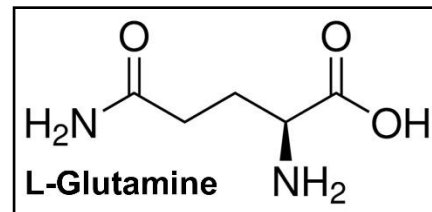
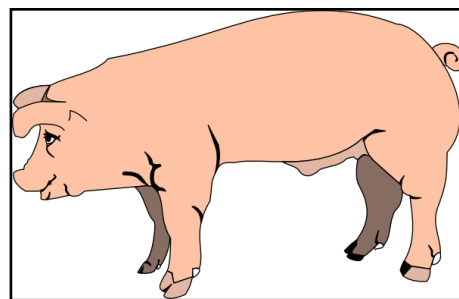
ARS Docket no. 156.09. Please contact David Nicholson: david.nicholson@ars.usda.gov

L-glutamine as an Alternative to Growth Promoting Antibiotics for Swine

Supplementing swine diets with L-glutamine provides similar animal performance and health benefits as growth promoting dietary antibiotics. Results suggest that optimum supplementation level is at or around 0.4% of the diet to achieve maximum benefits. L-glutamine supplementation can enhance recovery from stressful events such as weaning and transport by reducing inflammation and improving intestinal health. Specific data regarding growth promotion and pig health are included in the patent application.

Benefits

- Serves as a cost-effective replacement for growth promoting dietary antibiotics
- Improves growth rate and welfare of pigs in commercial production systems
- Enhances immune function and intestinal health of pigs



Applications

- Safe and efficacious dietary additive to promote growth, reduce inflammation and enhance intestinal health in swine reared in commercial swine production systems

ARS Docket no. 88.16. Please contact Renee Wagner: renee.wagner@ars.usda.gov

Pest Resistance Corn Genes

Several indigenous genes have been cloned from corn inbreds resistant to ear mold fungi and/or other fungi. Some of the indigenous genes have minor differences compared to homologous genes. When the indigenous genes are expressed in corn callus, they increase resistance to fungal infections and/or various insect pests. Levels of resistance have been associated with levels of direct or indirect gene products in several cases so far. Many gene products have previously unreported actions or have never been examined before.



Benefits

- Provides increased resistance to major insect and fungal pests of corn
- When expressed together they could provide high resistance against insect and fungal pests
- Several have previously unreported modes of action

Applications

- Enhancing insect and fungal resistance using the indigenous corn genes. Reduction of fungal infections reduce mycotoxin production in corn. One can use gene editing techniques (such as CRISPR/CAS9) to produce the rare, indigenous genes.

ARS Docket no. 107.18. Please contact Renee Wagner: renee.wagner@ars.usda.gov

Automated Bin System Filing System

An automated mechanical bin filling system for moving bulk fruit or vegetables from a feed conveyor to a mobile storage bin. The system transfers bulk products with minimal damage. It consists of three components, a fruit



accumulating section, a fruit transfer incline and a mobile tray.

Benefits

- Efficiently transfers bulk products from a conveyor-type feeder to a storage container without significantly damaging the products
- The invention is compact, should be commercially reliable and fills bins evenly

Applications

- A bin filler for the fruit and vegetable industry that does not inflict damage to produce during filling

ARS Docket no. 18.06. Please contact Jim Poulos: jim.poulos@ars.usda.gov

Available Technologies for Licensing

Each year, approximately 60 new patents are issued by the U.S. Patent Office for USDA inventions. The Office of Technology Transfer (OTT) transfers these inventions through licenses to the private sector for commercialization. Click [here](#) for a link to *recently filed* U.S. patent applications that are available for licensing.

Snapshot of ARS Technology Transfer

A brief information sheet that highlights some ARS Technology Transfer metrics and commercial products resulting from ARS Research. Click [here](#) to read.

Resources for Businesses

Some resources for small businesses at USDA and other Federal agencies. Click [here](#) to read.

ARS Latest News

USDA's ARS is a leading source for U.S. agricultural research. The ARS vision is to lead America towards a better future through agricultural research and information. Click [here](#) for latest news.



USDA Blog

Check out USDA Blog site for updates on Agricultural issues. Click [here](#) to read. One can sign up for email updates on the website by checking boxes of categories of interest including the blog, news categories and social media.

ARS

The Agricultural Research Service (ARS) is USDA's primary internal research agency. ARS conducts research to develop and transfer solutions to agricultural problems that are both national and international in scope. ARS has nearly 2,000 scientists nationwide and a few in overseas locations. ARS scientists carry out 690 research projects on a variety of subjects. ARS has a Congressional mandate to disseminate the research findings of these projects to the American public and other interested parties. Learn more by visiting: <http://www.ars.usda.gov>

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