

# Technology Transfer for Plant Breeders



**Office of Technology Transfer  
Office of National Programs  
Area Technology Transfer Office  
Agricultural Research Service**

# **Topics to be covered:**

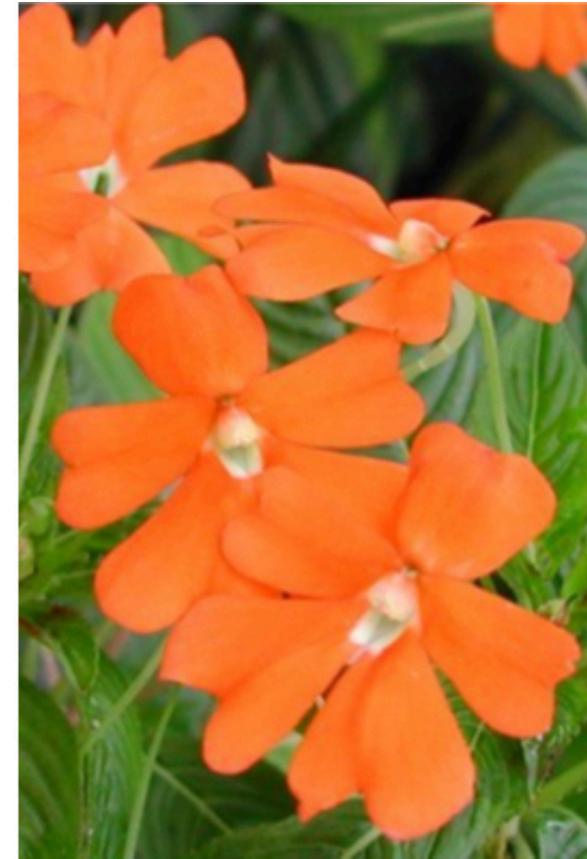
- 1) General overview**
- 2) Priorities & policies**
- 3) Protection options**
- 4) Licensing options**
- 5) IP issues**
- 6) TT mechanisms & agreements**
- 7) Summary**
- 8) Q&A**

# ***1) General overview***

## **Mojdeh Bahar, OTT**

- 2) Priorities & policies**
- 3) Protection options**
- 4) Licensing options**
- 5) IP issues**
- 6) TT mechanisms & agreements**
- 7) Summary**
- 8) Q&A**

**ARS has a long & successful history of developing enhanced germplasm & finished cultivars that are transferred through public release.**



**Today, public release may not be the most appropriate mechanism.**

**Frank and Ernest**



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# Reasons for Protecting Cultivars

- **Facilitates technology transfer**
  - ✓ **Tool to allow broader distribution**
  - ✓ **Incentive for private sector to invest in getting the cultivar in hands of growers**
- **Can be used to maintain genetic identity & assure the appropriate maintenance of unique traits**
- **Enhances U.S. economic development, global competition and sustainable economic security**



## From the Archive



For the full 1951 article, visit  
[www.sciencenews.org/archive\\_garden](http://www.sciencenews.org/archive_garden)

### Plant something new

The best home gardens this year will include a few of the new vegetable varieties along with the old favorites.

Radishes, beets and peppers will be pretty much the same old stand-bys; some of the beans, tomatoes, onions, and squash will be recent developments. In addition, many back-yard and vacant-lot gardens will have a vegetable or two not previously planted, such as endive, broccoli and kohlrabi.

New vegetable varieties for your garden are constantly being developed by the U.S. Department of Agriculture, state research stations and commercial seedsmen. Sometimes these are noteworthy because of their overall high quality or high productivity — these you will want to try. Sometimes they are tailor-made to lick some particular disease, or to grow specially well in certain climates or in certain soils — consider local conditions before planting these.



Tangerine Dream peppers are an edible ornamental variety developed by the U.S. Agricultural Research Service.

#### UPDATE

## Veg developers still full of ideas

Green thumbs at the U.S. Department of Agriculture haven't stopped rolling out new plant varieties. Recently, the gardener's bounty has included a plethora of

overcome emerging pests.

One such menace is a fungus called wheat rust, which turns wheat stalks into black messes of broken stems (*SN*: 9/25/10, p. 22).



protected  
→

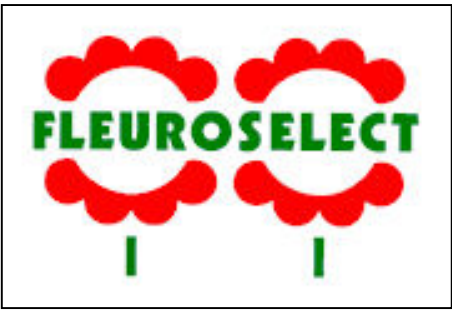
**EXCLUSIVE  
LICENSE**

↓  
**Marketing**

**'Black Pearl'**

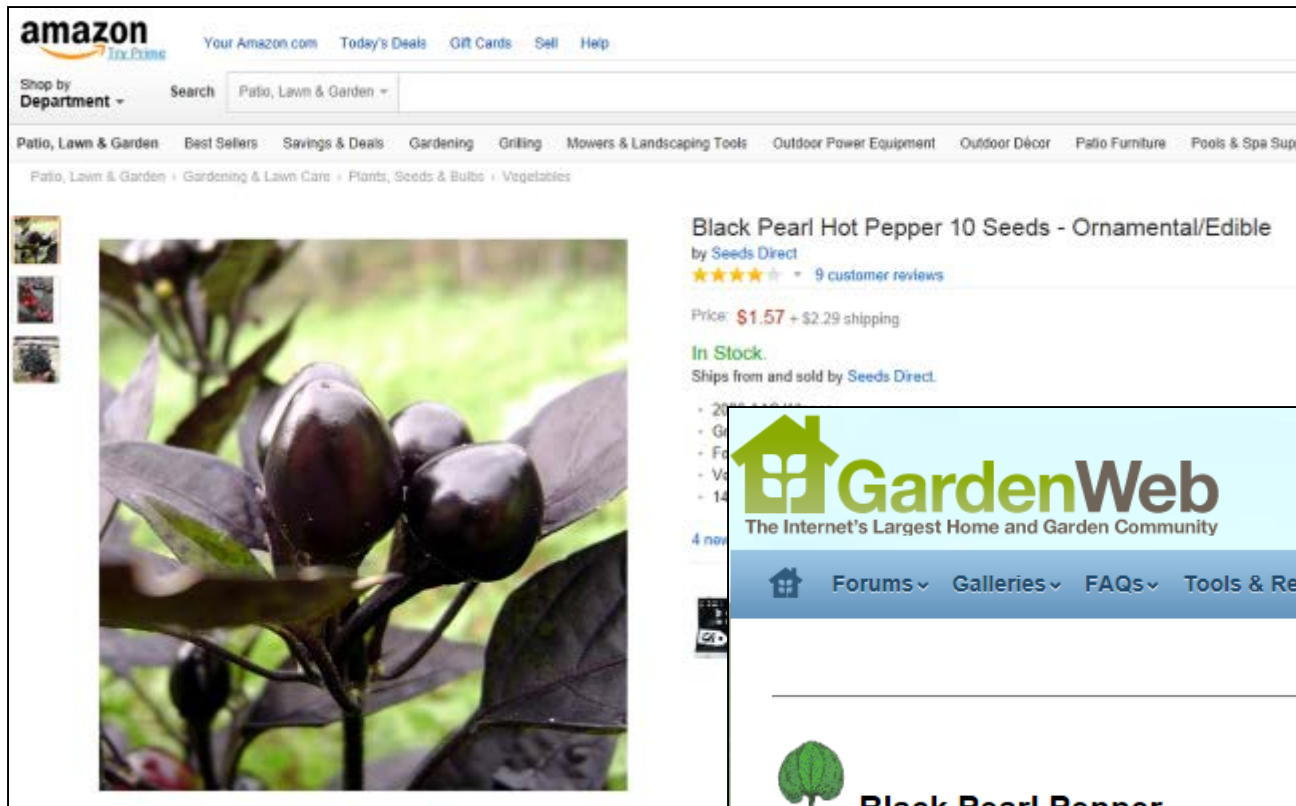


←





# Widely available and grown




The screenshot shows an Amazon product page for "Black Pearl Hot Pepper 10 Seeds - Ornamental/Edible" by Seeds Direct. The product is priced at \$1.57 plus \$2.29 shipping and is currently in stock. The page features a large image of the dark purple, pear-shaped peppers on a plant. The Amazon navigation bar at the top includes the Amazon logo, search bar, and various category links like "Patio, Lawn & Garden".

amazon  
Your Amazon.com Today's Deals Gift Cards Sell Help

Shop by Department - Search

Patio, Lawn & Garden Best Sellers Savings & Deals Gardening Grilling Mowers & Landscaping Tools Outdoor Power Equipment Outdoor Décor Patio Furniture Pools & Spa Supply

Patio, Lawn & Garden > Gardening & Lawn Care > Plants, Seeds & Bulbs > Vegetables



**Black Pearl Hot Pepper 10 Seeds - Ornamental/Edible**  
by Seeds Direct  
★★★★☆ 9 customer reviews

Price: **\$1.57** + \$2.29 shipping

**In Stock.**  
Ships from and sold by Seeds Direct.



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## Black Pearl Pepper Plants

 [clippings](#)

[clip this post](#) [email this post](#) [what is this?](#)

[see most clipped and recent clippings](#)

Posted by [Sugi\\_C](#) none ([My Page](#)) on Thu, Feb 21, 13 at 19:48

Hi all -

Quick question: does anyone know a reputable place at which to order Black Pearl Pepper plants? At most, I want two - and I found one eBay dealer that will sell 4 at a time but can't seem to find any vendor that sells plants, not seeds, and will also ship to CA and ship one or two.

# USDA Plant Breeding Road Map



United States Department of Agriculture

## USDA Roadmap for Plant Breeding March 11, 2015

### Final Report

Office of the Chief Scientist  
Research, Education, and Economics Mission Area



<http://www.usda.gov/documents/usda-roadmap-plant-breeding.pdf>

# USDA Plant Breeding Listening Session

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**Stakeholders have been engaging  
USDA officials about their needs  
and priorities for plant breeding.**



**Held August 2013 a public Plant Breeding  
Listening Session with a broad base of  
stakeholders interested in plant breeding.**

# USDA Plant Breeding Listen Session

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## Stakeholder concerns:

- **Need to recruit & educate future plant breeders**
- **What is the optimal use of intellectual property rights (IPR) and tech transfer mechanisms?**
- **What is an optimal balance of public & private investment in plant breeding?**
- **Funding the model: Intra vs. extramural? Public vs. Private? Joint endeavor?**



# USDA Plant Breeding Listen Session

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Stakeholders broadly agree on USDA's *core contributions* to plant breeding:

- **The National Plant Germplasm System (NPGS): both genetic resources *per se*, and the Genetic Resources Information Network (GRIN);**
- **New genetic tools and methods for faster breeding progress**
- **Identification of new traits in original and enhanced germplasm and improved cultivars**

# USDA Plant Breeding Road Map

## ARS Plant Breeding Priorities:

- Increase plant breeding research capacity for all crops.
- Increase timely access to elite genetic backgrounds so that new traits can be moved expeditiously into agriculturally outstanding cultivar backgrounds.
- Streamline the process for efficient transfer of new varieties to growers by enabling faster final breeding, seed increase, and/or seed distribution.
- Increase the use of new technologies to obtain high-throughput phenotypic information to link the genotype and phenotype for improved varieties.
- Develop new informatics/bio-informatics and biometrics tools to enhance selection.

1) **General overview**

***2) Priorities & policies***

**Roy Scott, ONP**

3) **Protection options**

4) **Licensing options**

5) **IP issues**

6) **TT mechanisms & agreements**

7) **Summary**

8) **Q&A**

# HANDLING VARIOUS TYPES OF RELEASES

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## ARS Releases without a Partner:

- Know the needs and the resources available before beginning
- Consult with ONP to confirm need before you begin – germplasm vs. cultivar (this may change during development)
- This may be based on the Action Plan Anticipated Products
- Consult with ONP in advance to determine appropriate type of release (public release or not)



# HANDLING VARIOUS TYPES OF RELEASES

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**TIP: Releasing and licensing are two separate processes!**

## **ARS Joint Releases with Universities**

- **Who is the PI? This will determine which system governs the release mechanism**

## **Joint Releases with ARS Lead**

- **Know university commercialization structure –conflicts with ARS policy? Consultation with ONP and OTT will determine type of release**
- **Seek ONP early approval to release before university committee meets for approval!**
- **Plant Protection Committee (PPC) will determine if protection is needed; OTT will determine licensing**

# HANDLING VARIOUS TYPES OF RELEASES

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**TIP: ONP decides the type of agreement; your TTC and OTT negotiates the agreement, not the breeder!**

## **Private Partnerships:**

- **Type of partnership (determined before the work begins) will determine the release mechanism and licensing**
- **Consult with ONP about type of partnership and OTT and your TTC about negotiating and establishing the partnership**
- **Focus on ARS priorities and National Program Action Plan**

# ONP GENERAL POLICY FOR PLANT RELEASES

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**Tip: ARS seeks the most effective means of delivering technology to the public.**

- **Public release of plant materials without IP protection is the default ARS policy.**
- **Decisions are made on a case-by-case basis.**
- **Cases are examined by the ARS Plant Protection Committee (PPC).**
- **Initial discussions should begin with ONP before a formal request to release is submitted.**

# DISTINGUISH BETWEEN RELEASING AND SHARING

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**TIP: Releasing and Sharing are two separate processes and are governed by different policies.**

- **All plant material releases require ONP approval, no exceptions!**
- **Sharing materials does not require ONP approval, but require proper agreements through your TTC and OTT (PEA and Breeding MTA)!**
- **OTT confirms agreements with ONP**



# POLICY FOR SHARING PLANT MATERIALS

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## Sharing involves receiving or giving materials

### Receiving materials

- For applied breeding purposes (MAS and other molecular modifications may have different rules)
- For evaluation or research purposes

### Giving materials

- Public releases – unprotected
- Releases with various forms of protection (PVP, Plant Patent)
- Rules may vary according to crop species and type of agreement

# POLICY FOR RECEIVING MATERIALS

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**Tip: Understand clearly what you are receiving and the terms of use (Check with your TTC and OTT about proper use of materials with specific terms of agreements)**

**All materials received for breeding require a written agreement that specifies the terms of use – No exceptions**

- **Material Transfer Agreement or Standard Material Transfer Agreement**
- **Collaborative research agreement (CRADA, TFCA/NFCA)**
- **Consult with your TTC**

**Materials imported or received domestically require proper documentation that specify terms of use**

- **This will determine if plant materials can be added to the germplasm collection and how it can be used**
- **All collection trips must be sanctioned by NPGS**
- **All materials received must be used according to the terms of the collaborative research or licensing agreement**

# POLICY FOR GIVING MATERIALS

**TIP: Understand clearly what you are giving and be clear about the terms of use – May or may not require agreement!**

## Germplasm

- Released – freely given without restrictions
- Unreleased – require Breeding MTA or PEA that specifies terms of use

## Cultivars

- ARS Public Releases – freely given without restrictions
- ARS Releases with university partners – check with university
- ARS Releases with private partners – check with partner
- Protected by PVP – requires a license
- Protected by plant patent – requires a license

# PLAN AHEAD BEFORE MAKING THAT CROSS!

- **What will the finished product be (cultivar, germplasm, mapping population, genetic stock)**
- **How will the material be preserved and curated (seeds, clonally, etc.)**
- **Commercial value of the trait(s): who will commercialize, who will use it.**
  - **Will drive type of material to develop and partnerships**
- **Do you need partnerships and who would be the best partners (CRADA)**
  - **Will drive type of licensing and influence guiding policies**
- **Seed distribution mechanism (will protection aid distribution?)**
- **What type of protection (plant patent, PVP)**
  - **Will drive activities and policies during development (how you share germplasm, pre-publication, type of data to collect).**
- **Be aware of the various types of agreements available**
  - **Differences between MTA and SMTA, and effects of each on sharing**



# IMPORTANT TECH TRANSFER CONSIDERATIONS

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**Determine interest in technology or product but do not negotiate Intellectual Property!**

- Do not make verbal or written promises during discussions about interests and collaborations
- Do not accept materials for breeding without written agreements

**Consult with ONP, your TTC and OTT before discussing partnerships (ex. CRADA discussions)**

- Negotiating the scientific components of a collaboration (Statement of Work) is not the same as negotiating the entire partnership agreement with legal language
- You need ONP approval to negotiate the scientific components of a collaboration.

# **PUBLIC NOTIFICATION POLICY OF PLANT MATERIAL RELEASES**

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- **A public release notice is required and the breeder is responsible for preparing the release notice.**
- **The release notice is a 1-2 page document written for the Deputy Administrator to publicly announce an ARS release, not a personal document of the breeder!**
- **The release notice should contain an accurate scientific description of the development methodology and the trait(s) offered.**
- **Scientific publication of plant material releases is not required, but strongly encouraged!**

1) **General overview**

2) **Priorities & policies**

***3) Protection options***

**Gail Poulos, OTT**

4) **Licensing options**

5) **IP issues**

6) **TT mechanisms & agreements**

7) **Summary**

8) **Q&A**

# Types of Protection for Plants

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- **Cultivar protection**
  - ✓ **Plant Patent**
  - ✓ **Plant Variety Protection Certificate**
- **Traits, genes, plant parts, etc.**
  - ✓ **Utility Patent**

# Cultivar Protection in the US

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**Asexually propagated plants:**  
**Plant Patent**

**Sexually propagated plants:**  
**Plant Variety Protection Certificate**

# Plant Variety Protection Certificate (PVPC) 7 U.S. Code §§ 2321 et seq.

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- **Sexually reproduced plants, F1 hybrids and tuber propagated plants**
- **Cultivar must be new, distinct, uniform & stable**
- **Variety has not been sold or released in the US more than one year prior to the date of the application.**

# PVPC (cont.)

- Excludes others from selling, offering for sale, multiplying, conditioning, importing, exporting and stocking the cultivar for 20-25 years
- Allows the restriction of seed sales to a class of certified seed
- Allows use as parent in breeding new **distinct** varieties



# PVPC Exemptions

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- **Crop Exemption or Farm Saved Seed:** save for use on own farm but **NO** transfer to others for reproductive purposes (Sec. 113)
- **Research (Breeding) Exemption:** Others can use the variety in plant breeding to create a **NON**-essentially derived variety (Sec. 114)

# Plant Patents (PP)

35 U.S. Code §§161-164

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- **Asexually reproduced plants (not including tuber propagated plants)**
- **Variety must be new, distinct, & stable**
- **Variety has not been sold or released in the US more than one year prior to the date of the application.**

# PP (cont.)

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- **Right to exclude others from making, using, selling, offering for sale and importing the plant, or any of its parts**
- **Protects a single plant and asexual progeny for 20 years**
- **Allows use as parent in breeding new varieties**

# PP Exemptions

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- **Crop Exemption or Farm Saved Seed: NO**
- **Breeding Exemption: Maybe\***

\* It depends upon the owner, ARS and some universities and companies allow the breeding of new cultivars from Plant Patented cultivars.

# Utility Patents (UP)

35 U.S. Code §§ 111 (101,102,103,112)

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- Must be **ELIGIBLE** subject matter: process, machine, manufacture, or composition of matter (Sec. 101)
- Claims must be **NOVEL** and **NON-OBVIOUS** to one of ordinary skill the art (Sec. 102 & 103)
- There must be a sufficient written description with **DEFINITE** and **ENABLED** claims (Sec. 112)

# UP (cont.)

- **Right to exclude others from making, using, selling, offering for sale, and importing the patented technology in the granting territory for 20 years after the effective filing date**
- **Possible to protect cultivars having specific traits, plant parts, and methods of producing or using plant cultivars**

# UP Examples Related to Plants

- **Particular traits**
- **Whole plants expressing a particular trait**
- **Plant parts, components or products with particular trait**
- **Methods of producing or using plants/varieties, including plant breeding methodologies**



# UP Exemptions

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- **Crop Exemption or Farm Saved Seed: NO**
- **Breeding Exemption: NO**

**Plant & Utility Patents**  
**U.S. Dept. Commerce-**  
**U.S. Patent & Trademark Office**

<http://www.uspto.gov/web/offices/pac/plant>

**Plant Variety Protection**  
**Certificate**  
**U.S. Dept. Agriculture-**  
**Agricultural Marketing Service**

<http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELDEV3002796>

# Cultivar Protection outside the US

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- **International Union for the Protection of New Varieties of Plants (UPOV)**
- **Plant Breeder Rights** is the equivalent outside the US of a Plant Variety Protection Certificate and a Plant Patent
- **Done on a case-by-case basis, generally at the request of the licensee**

1) **General overview**

2) **Priorities & policies**

3) **Protection options**

***4) Licensing options***

**Brian Nakanishi, OTT**

5) **IP issues**

6) **TT mechanisms & agreements**

7) **Summary**

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# Licensing Revenue Distribution

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- **Co-breeder's Institute/Company**
- **ARS**
  - ✓ **Inventor(s) incentive award**
  - ✓ **OTT operating expenses**
  - ✓ **Innovation Fund**

# USDA / University Arrangement

- **Many USDA plant breeders are co-located on University campuses. Long-standing arrangement between USDA and University for USDA plant breeders to utilize University infrastructure and resources.**
- **Historically, many USDA and University plant breeding programs are coupled where USDA primarily does germplasm enhancement and the University primarily does cultivar development.**
- **USDA no longer does seed increase or plant indexing and relies on University Foundation Seed Services (produces breeder / foundation seed) and Foundation Plant Services (produces disease-tested plant propagation material).**

# USDA / University Arrangement

- **Co-owned Cultivar**  
Generally, USDA takes the lead in protecting the co-owned cultivar and the University takes the lead in licensing the co-owned cultivar.
- **USDA solely owned Cultivar**  
USDA protects solely owned USDA cultivars. The University MAY take the lead in licensing solely owned USDA cultivars that are developed on their campus. A Federal Register Notice is required.



# Commercialization Model 1

- **USDA and 3 public universities developed many different variety of potato**
- **All entities are co-owners**
- **A non-profit entity is in charge of marketing, licensing, industry interaction and royalty collection**
- **Established to enhance the impact of the collaborative research**

# Commercialization Model 2

- **Partnering with our university partner who partners with a non-profit organization that based on an MOU offers foundation seed services and seed certification services and has actively produced and sold seed**
- **USDA scientists are co-located with and collaborators of the University**
- **Non-profit has licensed many of USDA varieties**

- 1) **General overview**
- 2) **Priorities & policies**
- 3) **Protection options**
- 4) **Licensing options**
- 5) ***IP issues- breeding***  
**Jose Costa, ONP**
- 6) **TT mechanisms & agreements**
- 7) **Summary**
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# Plant Breeding: Freedom to Operate



# Plant Variety Protection Certificate (PVPC) 7 U.S. Code §§ 2321 et seq.

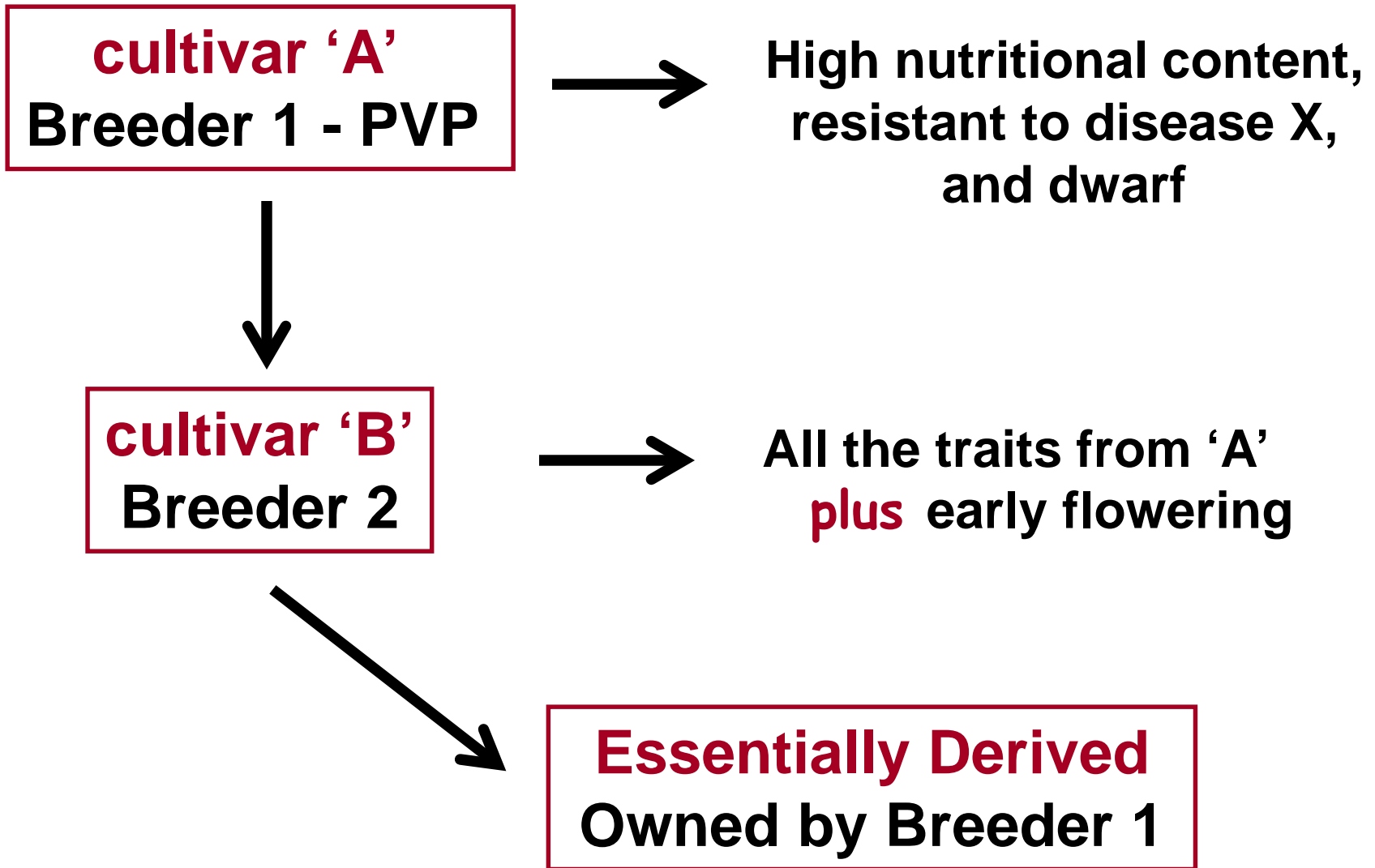
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- Sexually reproduced plants and tuber propagated plants
- Cultivar must be new, distinct, uniform & stable
- Excludes others from selling, offering for sale, multiplying, conditioning, importing, exporting and stocking the cultivar for 20-25 years
- Allows the restriction of seed sales to a class of certified seed
- Allows use as parent in breeding new **distinct** varieties

# Essentially Derived

## 7 U.S. Code § 2401

- 1) Predominantly derived from an initial cultivar, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial cultivar;**
- 2) It is clearly distinguishable from the initial cultivar;  
and**
- 3) Except for the differences that result from the act of derivation, conforms to the initial cultivar in the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial cultivar.**





# Utility Patents: Breeding Examples

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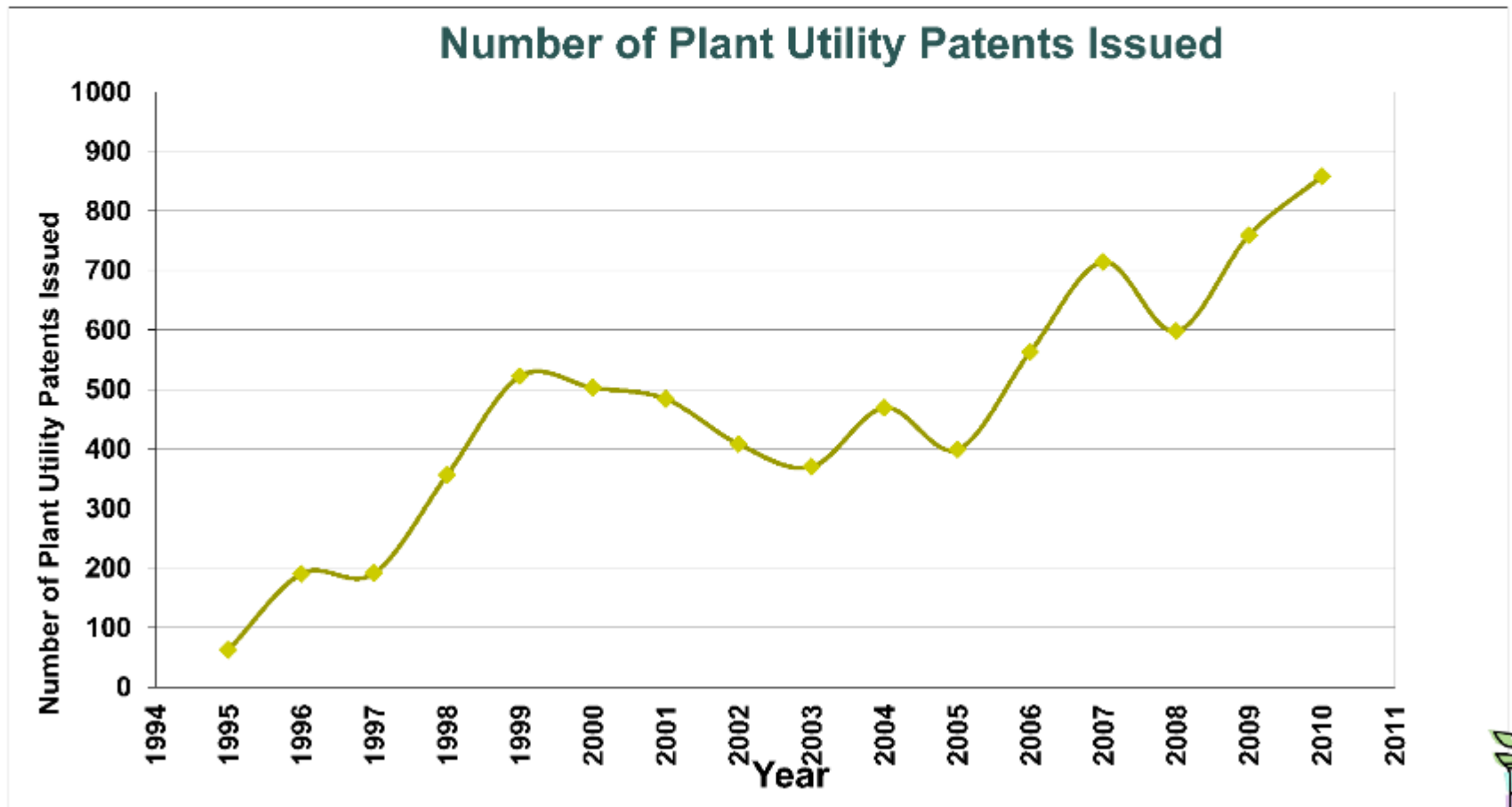
- **5,523,520** Mutant dwarfism gene in petunia (Goldsmith Seeds)
- **5,824,864** Maize gene and protein for insect control (bt Pioneer)
- **6,949,698** Gene combinations that alter the quality and functionality of soybean oil (Dupont)
- **6,646,183** DNA encoding for a disease resistance gene from common bean and methods of use (Michigan State University)

# UP: Examples on Breeding Methods

- **8,991,098** Method for improved plant breeding method for high throughput analysis of plant phenotype and genotype (BASF)
- **8,996,318** Using oligonucleotide microarrays to analyze genomic differences for the prediction of heterosis  
Structural variation analyzes of the genome are used to predict the degree of a heterotic phenotype in plants (Pioneer)
- **6,946,586** Genetic trait breeding method method for screening for a trait associated with the altered gene expression (Mendel)



# ↑ New Plant Varieties and Technologies



**Mark Janis** University of Iowa College of Law

**Jay Kesan** University of Illinois College of Law

**“expect it [PVPA] to diminish in importance relative to utility patent protection in at least some sectors of the plant breeding industry.**

**“The seed industry will focus even more heavily on protecting their innovations by way of utility patent protection”**

**Intellectual property protection for plant innovation: Unresolved issues after J.E.M. v. Pioneer.**  
*Nature Biotechnology* 20, 1161 - 1164 (2002)

# UP: Examples of Conventional Cultivars

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- **6,828,493 B1: Wheat Variety 25R47**  
Conventional soft red winter wheat cultivar (Pioneer)
- **8,309,830 B2: Wheat Variety Ruby**  
Conventional soft white winter wheat cultivar  
(Michigan State University)

1) **General overview**

2) **Priorities & policies**

3) **Protection options**

4) **Licensing options**

***5) IP issues- evaluation***

**Rob Griesbach, OTT**

6) **TT mechanisms & agreements**

7) **Summary**

8) **Q&A**

# Plant Evaluation Issues





# Breeder- 7 U.S. Code § 2401

**“Person who directs the final **breeding**\* creating a cultivar or who discovers & develops a cultivar. If the actions are conducted by an agent on behalf of a principal, the principal, rather than the agent, shall be considered the breeder.”**

**\*breeding = hybridization & selection**



# Co-breeder or agent?





# Final selection?

## Co-owned or Co-released?



# Plant Patent Negated by:

- **Sale or public use of the plant in the U.S. more than 1 year prior to filing for U.S. patent**
- **Description of the plant in a printed publication, combined with public availability (anywhere) more than 1 year prior to filing for U.S. patent**

**All these actions might be undertaken by a third person who obtained the plant directly or indirectly from the breeder**

# Permitted Experimental Activity & Testing

Manual Patent Examining Procedure 2133.03(e)(6)

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Development Testing **IS** permitted  
testing in the normal context of  
technological development

Market Testing **NOT** permitted  
testing to determine product  
acceptance



# Market or Development Testing?



# Plant Variety Protection Act

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**Any testing of numbered selections prior to official release must be under a *Material Transfer Agreement (MTA)* that requires data collection and reports.**

- 1) **General overview**
- 2) **Priorities & policies**
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- 4) **Licensing options**
- 5) **IP issues**

## ***6) TT mechanisms & agreements***

**Renee Wagner, TTC**

- 7) **Summary**
- 8) **Q&A**

# Material Transfer Agreement (MTA)

**An agreement that governs transfer of tangible research material between ARS and a non-ARS organization.**

- ✓ **Used to transfer biological materials, chemicals, data, software, equipment, plants, animals, and insects**
- ✓ **Protects proprietary / patent rights**
- ✓ **Maintains control and restricts the use of material**
- ✓ **Does not transfer ownership**



# MTA: Plant Evaluation Agreement (PEA)

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- **Used to transfer germplasm for evaluation**
- **Protects proprietary and PP-PVP right**
- **Maintains control and restricts the use of germplasm**
- **Does not transfer ownership**
- **Requires NPL approval & SY, RL and TTC signature**

# MTA: Breeding Material Agreement

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- **Used to transfer germplasm for breeding**
- **Protects proprietary and PP-PVP rights**
- **Maintains control and restricts the use of germplasm**
- **Does not transfer ownership**
- **Requires NPL approval & SY, RL and TTC signature**

# Trust Fund Cooperative Agreement\* (TFCA)

An agreement between ARS and another party to perform collaborative & mutually beneficial R&D.

Funds may only flow from the collaborator to ARS.

- ✓ Patent-PP-PVP **NOT** expected
- ✓ No confidentiality provisions

\*If there are no funds exchanged, then the agreement is a Non-Funded Cooperative Agreement

# Cooperative Research and Development Agreement (CRADA)

An agreement between ARS and another party to perform collaborative & mutually beneficial R&D.

Funds may only flow from collaborator to ARS.

- ✓ Patent-PP-PVP **IS** expected
- ✓ Confidentiality provisions

# Non-Assistance Cooperative Agreement (NACA)

An agreement between ARS and another party to perform collaborative & mutually beneficial R&D.

Funds flow from ARS to collaborator

- ✓ The **ONLY** mechanism for ARS to transfer funds to another party
- ✓ It must be for conducting research work that **CANNOT** be done in-house

# Agreement Templates

<http://www.ars.usda.gov/AboutUs/Docs.htm?docid=24747>

U.S. DEPARTMENT OF AGRICULTURE  
Agricultural Research Service

ARS Plant Evaluation Agreement

**PARTIES:**

ARS:           USDA, ARS, Area  
                  Research Unit  
                  Scientist Address  
                  City, State Zip  
                  Tel: Telephone # of Scientist  
                  FAX: FAX # of Scientist  
                  E-Mail: E-mail address of Scientist

Cooperator:   Company Name  
                  Company Address  
                  City, State Zip of Company  
                  Tel: Telephone # of Recipient  
                  FAX: FAX # of Recipient  
                  E-mail: E-mail address of Recipient

WHEREAS, ARS has performed research to develop the Test Selections, which are defined below, and owns certain valuable property rights thereon; and

WHEREAS, ARS desires to have the Test Selections grown and evaluated for potential introduction and release; and

WHEREAS, Cooperator represents that it has the facilities, personnel and expertise necessary to grow and evaluate the Test Selections and is willing to expend its own resources to fulfill the Purpose (defined hereinafter) of this Agreement; and

WHEREAS, ARS desires to have the Cooperator grow and evaluate the Test Selections; and

WHEREAS, Cooperator desires to grow and evaluate the Test Selections for ARS under this ARS Plant Evaluation Agreement (hereinafter "Agreement").

NOW THEREFORE, in consideration of the foregoing and the mutual promises and obligations hereinafter set forth, ARS and Cooperator, intending to be legally bound, agree as follows:

**1. Definitions**

- a. "Test Selections" means: (a) [insert scientific name]; (b) [insert common name]; (c) [insert line #]; and (d) [insert # of plants, seeds, buds, scions, cuttings, or other plant parts]. (For example: (a) *Vaccinium corymbosum*; (b) Blueberry; (c) A54; and (d) 5 plants. Please delete this example after filling out Test Selections definition.)
- b. "Test Materials" means Test Selections, plants of the Test Selections, and any

kind of material of the Test Selections including but not limited to buds, scions, cuttings, seed, sports or other plant parts, including fruit.

- c. "Confidential Information" means the Test Materials and any and all information and data, technical and non-technical, which relates to the Test Materials and has been transferred to or disclosed to the Cooperator or has been generated under Agreement.

**2. Evaluation**

- a. Test Selections shall be evaluated "under this development and experimental testing Agreement" for field performance and
  - (1) .....
  - (2) .....
  - (3) .....
  - (4) .....

(hereinafter "Purpose"). Cooperator agrees that the evaluation performed under this Agreement and the resulting data does not qualify Cooperator as a breeder.

- b. ARS agrees to provide Test Selections to Cooperator and Cooperator shall grow such Test Selections on land provided by Cooperator at no charge to ARS.
- c. Cooperator shall not propagate Test Materials except as provided in 2.a. above or unless an ARS Plant Propagation Agreement covering the Test Materials has been executed.
- d. Cooperator shall not report on, describe for publication, or exhibit at trade shows or otherwise display publicly any of the Test Materials covered by this Agreement, except with the express written consent of ARS.

**3. Ownership of Test Material**

- a. The Test Materials shall remain the sole and absolute property of ARS.
- b. The Test Materials shall not be sold, transferred, assigned, shipped, or transported, in whole or in part, by the Cooperator to any other person or persons, domestic or foreign, for any purpose whatsoever without the express written consent of ARS.
- c. Any and all requests for Test Materials that are received by the Cooperator shall be referred to ARS.
- d. Cooperator acknowledges that the Test Materials represent and contain valuable intellectual property. Cooperator shall not use, or permit others to use, any parts of the Test Materials for breeding, hybridizing or making selections.
- e. Cooperator agrees that ARS has permission to enter the property of Cooperator during normal business hours to repossess and remove said Test Materials.
- f. Cooperator shall not take any action that can jeopardize the intellectual property

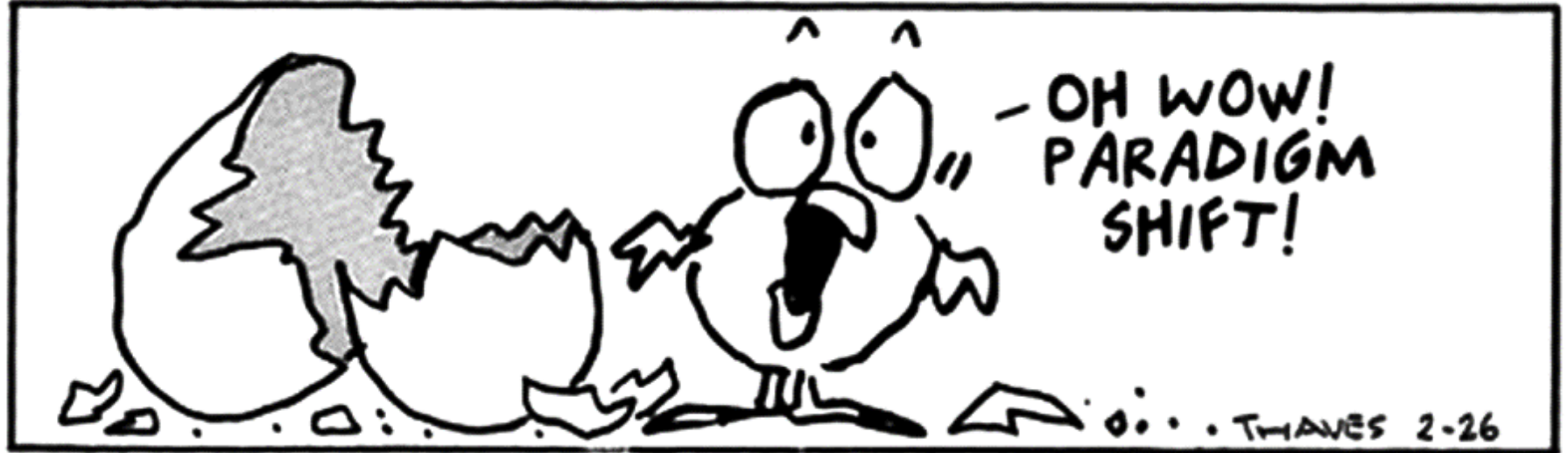
- 1) **General overview**
- 2) **Priorities & policies**
- 3) **Protection options**
- 4) **Licensing options**
- 5) **IP issues**
- 6) **TT mechanisms & agreements**

## ***7) Summary***

**Mojdeh Bahar & Rob Griesbach, OTT**

- Determine if you have freedom to operate
- Develop evaluation strategy
- Develop release strategy
- Protection the IP

## Frank and Ernest



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# Agricultural Economic Espionage A Growing Threat



FBI investigations indicate economic espionage and trade secret theft against US agricultural and biotechnology companies and institutes is on the rise. Over the past two years, foreign actors have targeted and collected against US companies, universities and government research facilities for agricultural information concerning plant genome, new variety development, breeding programs and advanced manufacturing processes. The FBI continues to lead efforts to mitigate, neutralize and disrupt the theft of US agricultural intellectual property and trade secrets that could be used by foreign governments or foreign companies to gain an unfair economic advantage.




**2016**

**ARS breeder  
pleaded guilty to  
facilitating the theft  
of genetic material  
and faces a penalty  
of up to 20 months  
in federal prison.**




# General Technology Transfer Presentations

 **Technology Transfer: Introduction** (Web Based ARS-OTT-Insider-Threat-Mod1)  
*Online Course* ✔ Already Assigned

This training will focus on the basics of technology transfer, on how and when to engage with techno [more](#)

☆☆☆☆☆ Not yet rated  
Free


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 **Technology Transfer: Licensing** (Web Based ARS-OTT-Insider-Threat-Mod4)  
*Online Course*

This training will focus on the basics of technology transfer, on how and when to engage with techno [more](#)

☆☆☆☆☆ Not yet rated  
Free


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 **Technology Transfer: Partnerships and Agreements** (Web Based ARS-OTT-Insider-Threat-Mod2)  
*Online Course*

This training will focus on the basics of technology transfer, on how and when to engage with techno [more](#)

☆☆☆☆☆ Not yet rated  
Free

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 **Technology Transfer: Patenting** (Web Based ARS-OTT-Insider-Threat-Mod3)

# New Plant Introduction & Release Procedures

The screenshot shows a PowerPoint presentation with 18 slides. The title slide (slide 1) is titled "New Plant Introduction & Release Procedures" and lists two main topics: "Physical cultivars / development genotypes" and "Genetic lines / stocks".

Slide 2: "When types of plants can be officially released?"

- Physical cultivars
- Development genotypes
- Genetic lines / stocks

Slide 3: "What are the main criteria for determining when a plant is ready for release?"

- Regulation or other release or genetic reasons
- Plant maturity
- Other health issues
- Defect and/or removal of other DNA

Slide 4: "Who decides when a plant is ready to be released?"

Primary responsibility of the scientist and approved from Research Center & National Program Leader

Slide 5: "Can new plant cultivars be patented or otherwise protected?"

ATTN: policy to be widely released with cultivars without protection. Decisions in this policy area for release are made by patent bodies.

Slide 6: "What are the reasons for protecting new cultivars?"

- To allow breeder without their patent rights
- To make it possible to distinguish between cultivars to protect the investment in the development of the cultivar
- To ensure genetic diversity is maintained
- To ensure the appropriate management of cultivar health

Slide 7: "All plants that are to be released must be entered into the Plant Material Dossier within the Licensee's Inventories Section of ARS."

- All Plant Material Inventories have a unique identifier for each cultivar or genetic line
- Plant Material Inventories are maintained in the Plant Material Inventory
- Plant Material Inventory is updated as new cultivars are released

Slide 8: "Question 1"

How to determine if a plant is ready for release?

Slide 9: "Question 2"

What are the main criteria for determining when a plant is ready for release?

Slide 10: "Question 3"

What are the main criteria for determining when a plant is ready for release?

Slide 11: "Question 4"

What are the main criteria for determining when a plant is ready for release?

Slide 12: "Question 5"

What are the main criteria for determining when a plant is ready for release?

Slide 13: "Question 6"

What are the main criteria for determining when a plant is ready for release?

Slide 14: "Question 7"

What are the main criteria for determining when a plant is ready for release?

Slide 15: "Question 8"

What are the main criteria for determining when a plant is ready for release?

Slide 16: "Question 9"

What are the main criteria for determining when a plant is ready for release?

Slide 17: "Plant Protection Committee is co-chaired by OTT & CRP & is composed of:"

- Technology Transfer Committee
- Plant Protection Committee
- Office of Plant Health Inspection
- Plant Protection Committee
- Plant Protection Committee
- Plant Protection Committee

Slide 18: A flowchart diagram showing the process of plant introduction and release, starting from "New Plant Introduction & Release Procedures" and leading to "Plant Material Inventory" and "Plant Material Dossier".

PowerPoint on OTT Axon page

<https://axon.ars.usda.gov/OTT/Pages/Home.aspx>

# "Deal Breakers" in Plant Breeding



**I developed a new disease resistant soybean by backcrossing a U of FL, disease resistant, PVPC cultivar into our line. Can USDA obtain a PVPC on the new cultivar?**

**I developed a new disease resistant soybean by backcrossing a U of FL, disease resistant, PVPC cultivar into our line. Can USDA obtain a PVPC on the new cultivar?**



**I developed a new disease resistant blueberry by backcrossing a U of FL, disease resistant, PP cultivar into our line. Can USDA obtain a PP on the new cultivar?**

**I developed a new disease resistant blueberry by backcrossing a U of FL, disease resistant, PP cultivar into our line. Can USDA obtain a PP on the new cultivar?**





**I finished a breeding project that took 15 years to complete. Since my colleague only helped me in making the final selection, I do not need to include him as a co-breeder.**

**I finished a breeding project that took 15 years to complete. Since my colleague only helped me in making the final selection, I do not need to include him as a co-breeder.**



**Even though my university collaborator is not a co-breeder, I plan on co-releasing the new cultivar with the university.**

**Even though my university collaborator is not a co-breeder, I plan on co-releasing the new cultivar with the university.**



**Even though my co-breeder's university is filing a plant patent on our joint release, I still need to enter the release into ARIS.**

**Even though my co-breeder's university is filing a plant patent on our joint release, I still need to enter the release into ARIS.**



**I can send selections to a collaborator for evaluation without an agreement, because I know her well and trust her.**

**I can send selections to a collaborator for evaluation without an agreement, because I know her well and trust her.**





**I want a company to evaluate my new orange tree for juice quality, but they are only willing to test its juice if they can sell it.**

**I want a company to evaluate my new orange tree for juice quality, but they are only willing to test its juice if they can sell it.**



**I want a company to evaluate my new orange tree for juice quality, but they are only willing to test its juice if they can sell it.**

**Strategy is  
Public domain**



**I want a company to evaluate my new orange tree for juice quality, but they are only willing to test its juice if they can sell it.**

**Strategy is  
plant patent**



# QUESTIONS



**Tech Transfer is  
a Team Effort**

**OTT, TTC-TAA, & ONP  
are here to help**