Protection of Plant Inventions in the U.S. and Benefits

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> UNITED STATES PATENT AND TRADEMARK OFFICE

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Long History of Plant Protection



Types of Intellectual Property Protection for Plants in the U.S.

Plant Patent Act

35 U.S.C. §§ 161-164

Utility Patent (to a Plant)

35 U.S.C. §§ 101 et seq. (102, 103, 112)

Plant Variety Protection Act

7 U.S.C. §§ 2321 et seq.

.S. Patent and Idemark Office

USDA



UPOV 1991 Act Article 35

Reservations

(2) (a) ... any State which, at the time of becoming party to this Convention, is a party to the Act of 1978 and which, <u>as far as varieties reproduced</u> <u>asexually are concerned</u>, provides for protection by an industrial property title other than a breeder's right <u>shall have the right to continue</u> to do so without applying this Convention to those varieties.



PLANT PATENTS

Asexually Reproduced Plants





Plant Patent

- Plant Patent Act, 1930 (35 U.S.C. §§ 161-164)
- Basic Requirements:
 - Plant is new and distinct from other known varieties
 - Plant has been asexually propagated
 - If "discovered," plant was found in a cultivated area
 - Description must be as full and complete as possible
 - Drawing or photograph
 - One claim



Plant Patent

Example: Standard Claim Structure-

• A Petunia plant substantially as described and illustrated in the specification herein.



Plant Patents



<u>PP22915 - Kniphofia</u> <u>plant named 'Papaya</u> <u>Popsicle'</u>



<u>PP22918 - Monarda</u> <u>plant named 'Sugar</u> <u>Lace'</u>



<u>PP23369 - Viola</u> <u>plant named</u> <u>'Blackout'</u>



PP22858 - Apple tree named 'NC1'



<u>PP23375 - Raspberry</u> <u>plant named 'Crimson</u> <u>Giant'</u>



PP23338 - Strawberry plant named 'NABILA'



Plant Patent

- 20 year term from <u>date of filing</u>
- Right to exclude others from making, using, selling, offering for sale and importing the plant, or any of its parts
- Protects a single plant, asexual progeny, and any of its parts



Plant Patent

Examples of Patent Fees (as of November 1, 2015)

Description	Fee USD	Small Entity Fee USD	Micro Entity Fee USD
Basic filing fee - Plant	180	90	45
Plant Application Size Fee - for each additional 50 sheets that exceeds 100 sheets	400	200	100
Plant Search Fee	380	190	95
Plant Examination Fee	580	290	145
Plant issue fee	760	380	190

No maintenance fee





PLANT VARIETY PROTECTION

Sexually Reproduced Plants and Tubers







Plant Variety Protection Act (PVPA)

- Encourages the development of new varieties of sexually reproduced plants
- Provides protection to those who breed, or discover and develop them
- Applies to plants:
 - <u>Sexually</u> (seed) reproduced
 - Tuber propagated
 - F1 hybrids





Requirements for Plant Variety Protection

A Variety must be:

- <u>New</u> (available less than 1 year in the US; less than 4 years in a foreign country)
- Clearly <u>Distinct</u> from all other varieties
- <u>Uniform</u> (all plants look alike)
- <u>Stable</u> (reproduces true to type)



U.S. PVP Key Features



- Main Requirements
 - New, distinct, uniform, stable
 - Plants must be sexually reproducible
 - Variety name required but not a registry
 - Deposit of propagation material
 - Seeds or in vitro samples (for potatoes)
 - Stored at the USDA National Center for Genetic Resources Preservation (NCGRP)
 - Available only with applicant's permission through PVPO
 - Publicly available after certificate expires





PVP Rights Granted

- Term: 20 years (25 years for trees or vines) <u>from issuance</u> of the certificate
- Rights to exclude others from
 - Selling or marketing
 - Conditioning or stocking
 - Offering for sale or reproducing
 - Importing or exporting
 - Using the variety to <u>produce</u> (as distinguished from develop) a hybrid or different variety





U.S. PVP Key Features



- \$4,382 for filing & examination
- \$768 for issuance.
- \$5, 150 TOTAL
 - No maintenance fees.



UTILITY PATENTS (Patents for Inventions)





Basic Patentability Standards

- Utility
- Novelty
- Non-obviousness
- Written Description
- Enablement
- Definiteness



Utility Patents to Plants

Possible to protect:

- Modified plant genes, proteins, products
- Transgenic plants
- Class of varieties with specific traits
- Plant variety
- Plant parts-cells, tissues, etc.
- Methods of producing or using plants/varieties
- Etc.



Utility Patents

- 20 years protection from date of filing
- Right to exclude others from making, using, selling, offering for sale, and importing the claimed invention
- Effective only within the United States, U.S. territories, and U.S. possessions
- Requires maintenance fees



STATISTICS



New Plant Varieties--Plant Patents

Granted Plant Patents 2001-2014



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Granted Plant Patents

All years, up to 2014

Total 18,076

Top 3 Foreign Countries	
Netherlands	3,095
Germany	2,154
Japan	918
Examples of Asia Countries	
India	51
Thailand	38
Indonesia	26
Taiwan	18
Korea, South	11
China	9

New Plant Varieties-PVP Applications



PVP Statistics (since 1970)

Total Applications Received	13,203
Total Certificates Issued	10,711
Certificates in force	7,048
Total applications not issued (abandoned, withdrawn, denied)	1,751
Applications in Progress (include those 1) not examined, 2) recommended for PVP but not issued, or 3) somewhere in the examination process)	741



New Plant Varieties and Technologies-Utility Patents



Benefits of Plant Variety Protection

- Incentivize investment in plant breeding and development of new varieties
- Increase numbers of new varieties of plants
- Improve genetics
- Benefit farmers and consumers



Private investment in plant breeding

Public and private research expenditures on plant breeding

Million 1996 dollars

600 500 400 Public research on "Biological efficiency" 300 200 100 Private research on plant breeding 0 1960 65 95 70 75 80 85 90

"Biological efficiency" Includes breeding and selection of Improved plant varieties.

Plant breeding as a share of total agricultural R&D expenditures

Percent



uspto

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Improved Genetics

Rate of genetic gain is proportional to level of IP



Dermot J. Hayes, Sergio H. Lence, and Susana Goggi Iowa State University (AgBioForum, 12(2): 155-171. ©2009 AgBioForum)



Improved Genetics

- Herbicide tolerance (alfalfa, cotton, maize, etc.)
- Insect resistance (cotton, maize, tomato)
- Drought tolerance (maize)
- Delayed ripening (melon)
- Virus resistance (papaya, plum, squash)
- Modified amylase (potato)
- Modified fatty acid content (canola, maize, soybean)
- Altered amino acid content (maize)



Robust Seed Trade

Calendar year 2012

Estimated Value (Million USD)

	Field C	rops	Vegetable Crops		Flower Seed	
Country	Import	Export	Import	Export	Import	Export
USA	873	930	369	529	70	72
Canada	133	317	75	3	15	72
Australia	57	84	53	24	3	31
Japan	98	33	113	91	20	21
Mexico	133	175	221	27	1	1
Chile	ND	218	ND	150	ND	20
Thailand	ND	7	ND	73	ND	ND

http://www.worldseed.org/isf/seed_statistics.html, access Nov 30, 2015

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Robust Domestic Seed Market 2012

Country	Estimated Value
	(USD million)
USA	12,000
China	9,034
Japan	1550
Canada	550
Australia	400
Mexico	350

http://www.worldseed.org/isf/seed_statistics.html, access Nov 30, 2015



Benefits of New Varieties of Plants

- Improve yield and crop productivity
- Provide alternative renewable energy
- Increase farmers' income
- Ensure food security
- Respond to climate change
- Improve health and nutrition
- Expand trade and economic growth
- More choices for consumers



Information Resources

http://www.uspto.gov/web/offices/pac/plant/index.html

http://www.uspto.gov/web/offices/pac/utility/utility.htm

http://www.ams.usda.gov/PVPO



