



2010 Analysis of the U.S. Non-GMO Food Soybean Variety Pipeline

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Japan Soy Food Summit

June 29-30, 2010 – Tokyo, Japan

- Sponsored by
 - USSEC/ASA-IM and MAFF (Japan's Ministry of Agriculture, Forestry and Fisheries)
- 9 Japanese soy food industries including...
 - the Japan Tofu Association
 - Zentoren (National Federation of Tofu Commerce & Industry Trade Association)
 - Federation of Japan Natto Manufacturers Cooperatives
 - Japan Federation of Miso Manufacturers Cooperatives
 - Japan Soy Sauce Association
 - Japan Vegetable Protein Foods Association and
 - Japan Soy Milk Association, etc.,





Concerns

Official

- MAFF – Concerned with food security
- Japan Soy Food Alliance – Concerned about ample supply of non-GMO soybean



Reality

- There is some competition among groups for access to soybeans
 - Each soy manufacturing group would like more attention from US suppliers
 - Canadians are better able to market to them





2010 non-GMO variety pipeline survey

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- The goal of the 2010 U.S. non-GMO food soybean variety survey was to assess both public and private soybean breeding programs in order to compile specific information about non-GMO food grade soybean variety development
 - varieties released in 2009,
 - varieties to be released in 2010,
 - and those that may be released in 3-5 years.





Survey methods

- We utilized a database of names from two professional groups
 - Public soybean breeders (Vince)
 - University faculty
 - USDA-ARS (Agricultural Research Service) scientists
 - Private soybean breeders (Clem)
 - Small private soybean companies
 - Large, multinational seed and biotech companies
- Non-GMO Sourcebook
- Personal contacts





Survey Results: responses

Private companies

- We received data from 8 private seed companies
- We extracted relevant data from websites of two additional private companies





Survey Results: responses

Public Breeders

- 12 breeders from 11 states responded to the survey request
- This represents just 30% of those contacted
- However, this is more than 50% of those identified previously as sources of non-GMO varieties and all of the most prolific breeders





Survey Results: responses

- We are confident that we received information from the majority of both public and private breeders releasing non-GMO varieties today.
- We received information back from all of the large multinational companies and the majority of the remaining small, independent companies





Survey Results: highlights

● 2009 Releases

● 20 Public – 2 Private

● 2010 Releases

● 17 Public – 17 Private

● Releases expected in the next 3-5 years

● >24 Public – 20 Private





Overview of the non-GMO pipeline



- There is activity in both public and private sectors
- New varieties are currently being released and promising lines are likely to be released in the near future
- New varieties appear to meet most food soybean market segments (tofu, natto, general purpose)
- Varieties have increased yield over previous varieties
- Varieties are being developed for most environments



Open-ended responses

● Public breeders

- Most respondents stated that they plan to increase emphasis on non-GMO variety development in the near future
- Respondents felt that they have seen an increase in non-GMO variety development by the public sector in recent years
- A few respondents stated that new molecular tools (e.g. MAS – marker assisted selection) will aid their effort to release larger numbers of high quality non-GMO varieties in the future





Open-ended responses

- Private breeders – small/private companies
 - Enthusiastic about increasing efforts to release non-GMO varieties
 - Focused on both production characteristics (yield and disease resistance) and quality traits (increased protein, better taste, greater tofu yield)
 - Moving breeding efforts into a wider range of production zones to broaden their own sales range which also broadens the range of production
 - Excited about MAS





Open-ended responses

- Private breeders – large companies
 - Focused on transgenic (GMO) type soybeans
 - Developing transgenic soybeans for food use
 - Do not release food type non-GMO soybeans
 - Do develop non-GMO germplasm for their own breeding programs – small scale
 - Maintain non-GMO populations so that they may re-enter non-GMO variety development if there is sufficient market demand





Summary



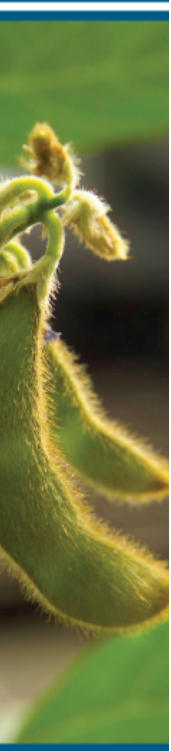
- Public soybean breeding programs are slowing increasing the rate of non-GMO variety release
- Most small soybean breeding companies have been acquired by large multinational seed companies. The remaining companies appear to be rapidly expanding their efforts in non-GMO variety development to fill the void.
- Large seed companies are not interested in non-GMO variety development



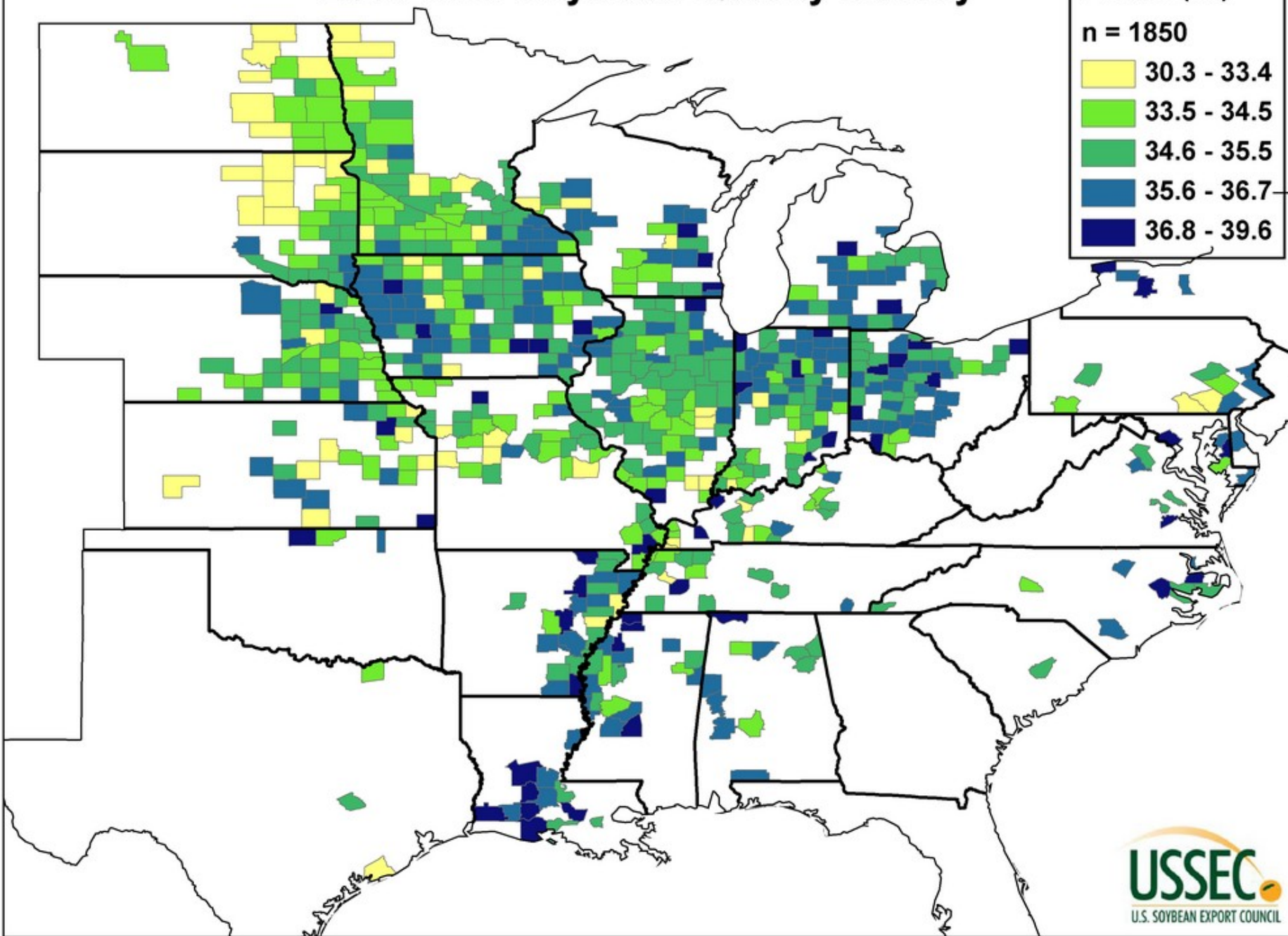
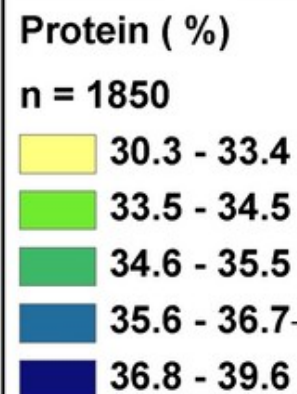
Lastly – as a reminder...

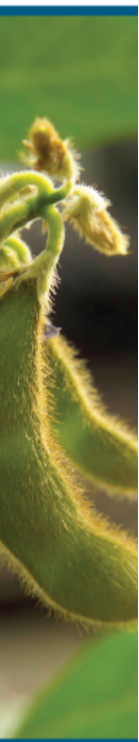
- Naeve and Orf conduct two Annual Soybean Quality Surveys
 - US Soybean Quality Survey
 - US Food Soybean Quality Survey
- Supported by USSEC
 - USB, ASA, USDA-FAS, and USDA-MAP





2010 U.S. Soybean Quality Survey

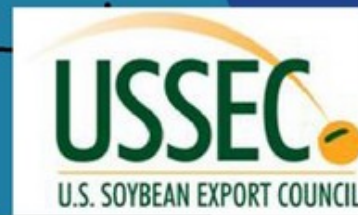
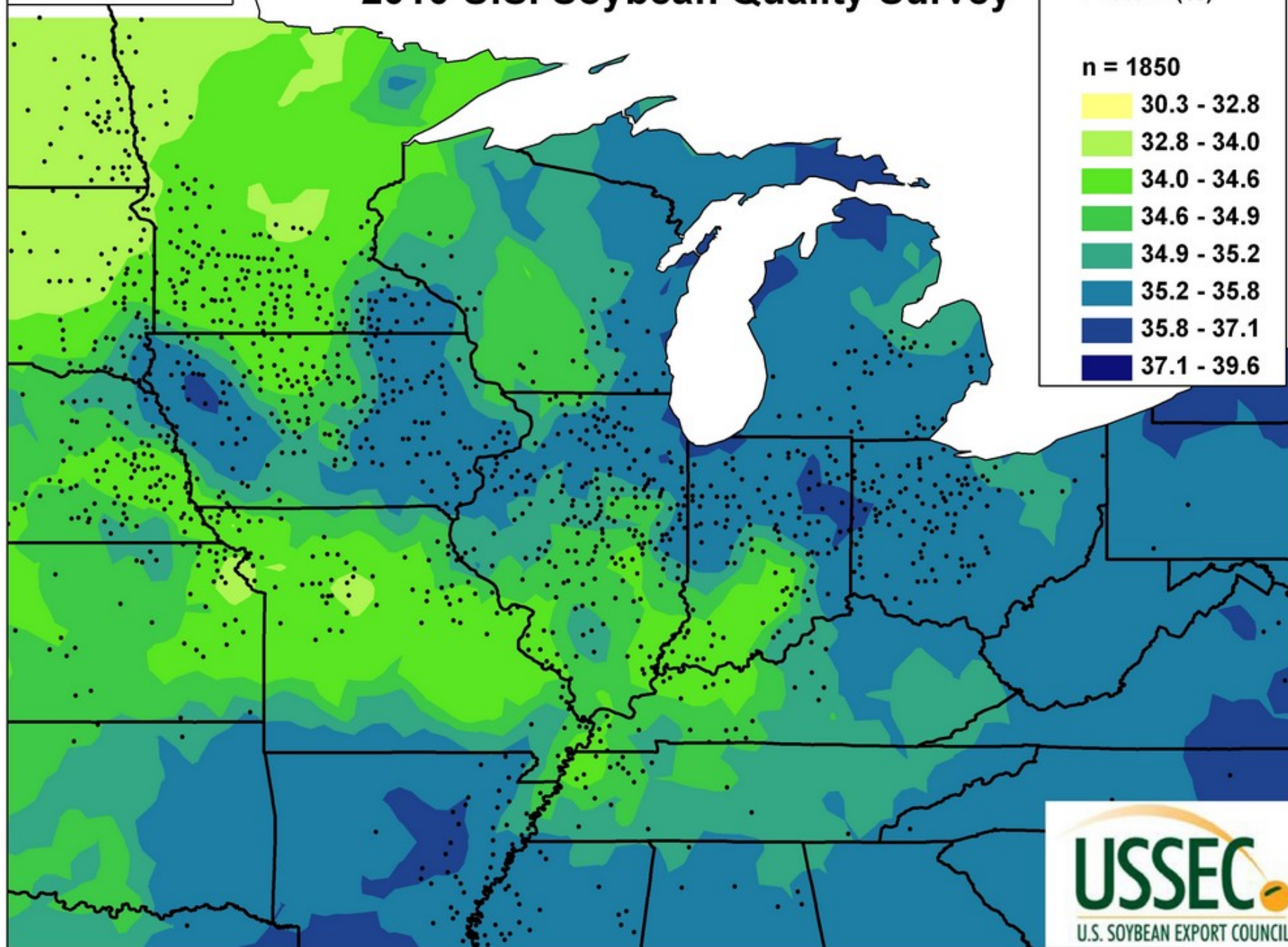


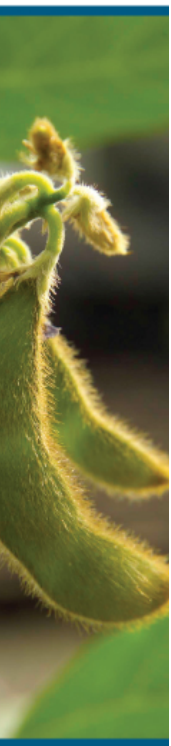


2010 U.S. Soybean Quality Survey

Protein (%)

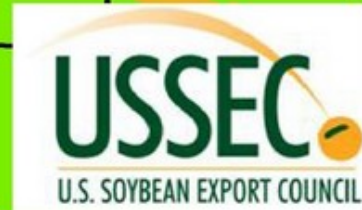
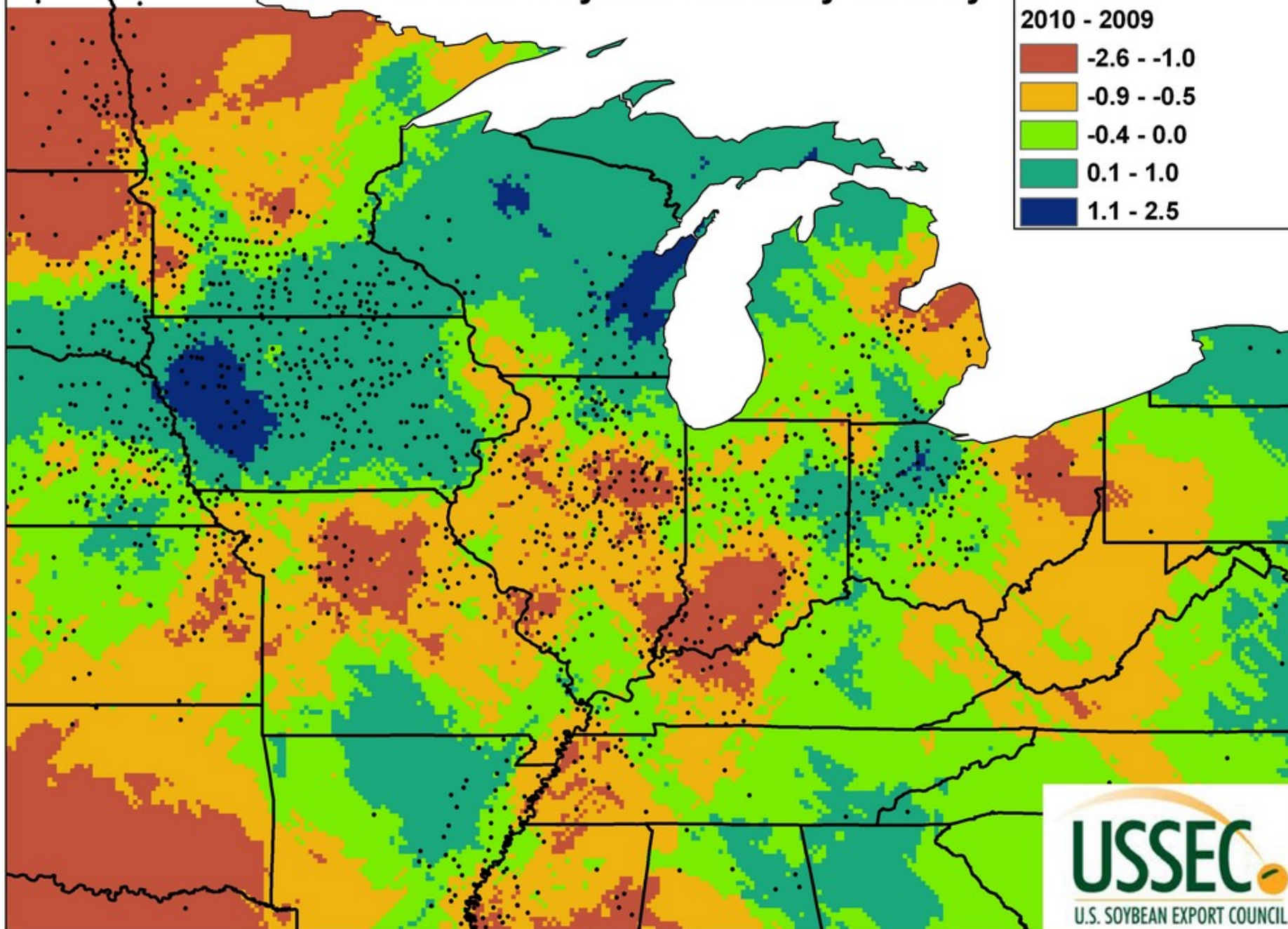
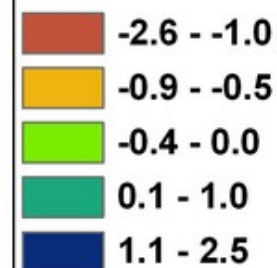
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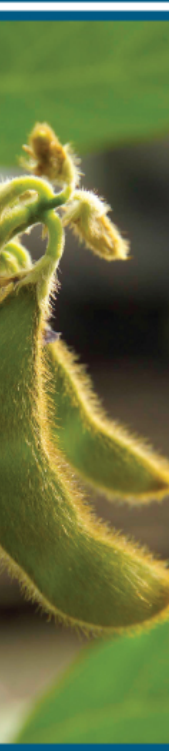




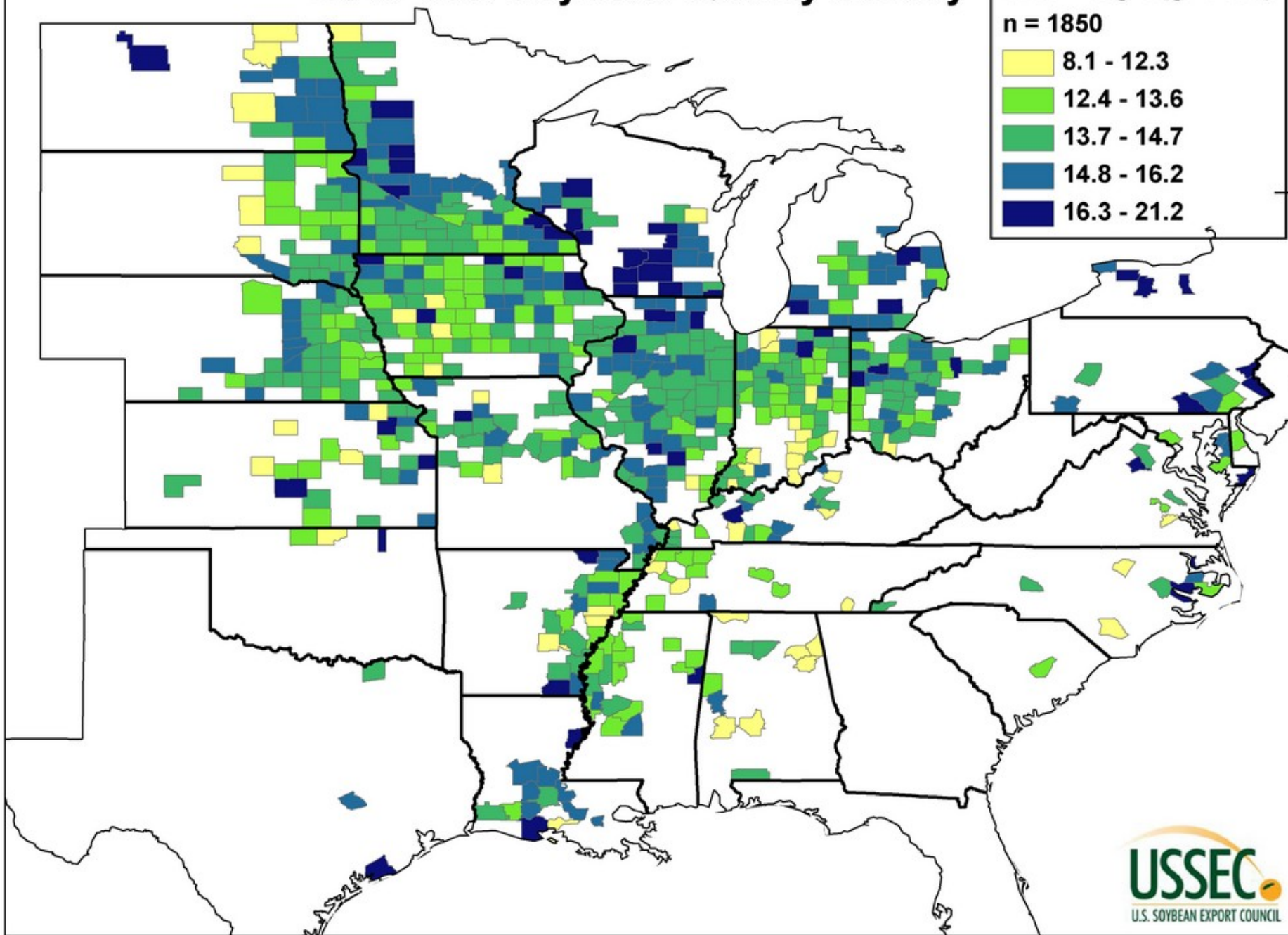
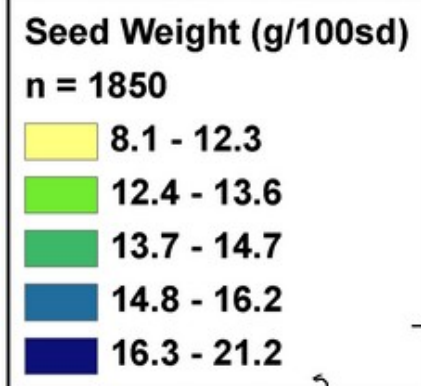
2010 U.S. Soybean Quality Survey

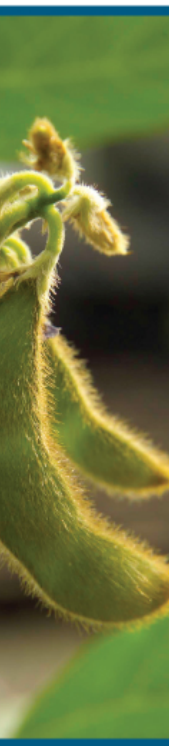
Protein (%) Difference
2010 - 2009



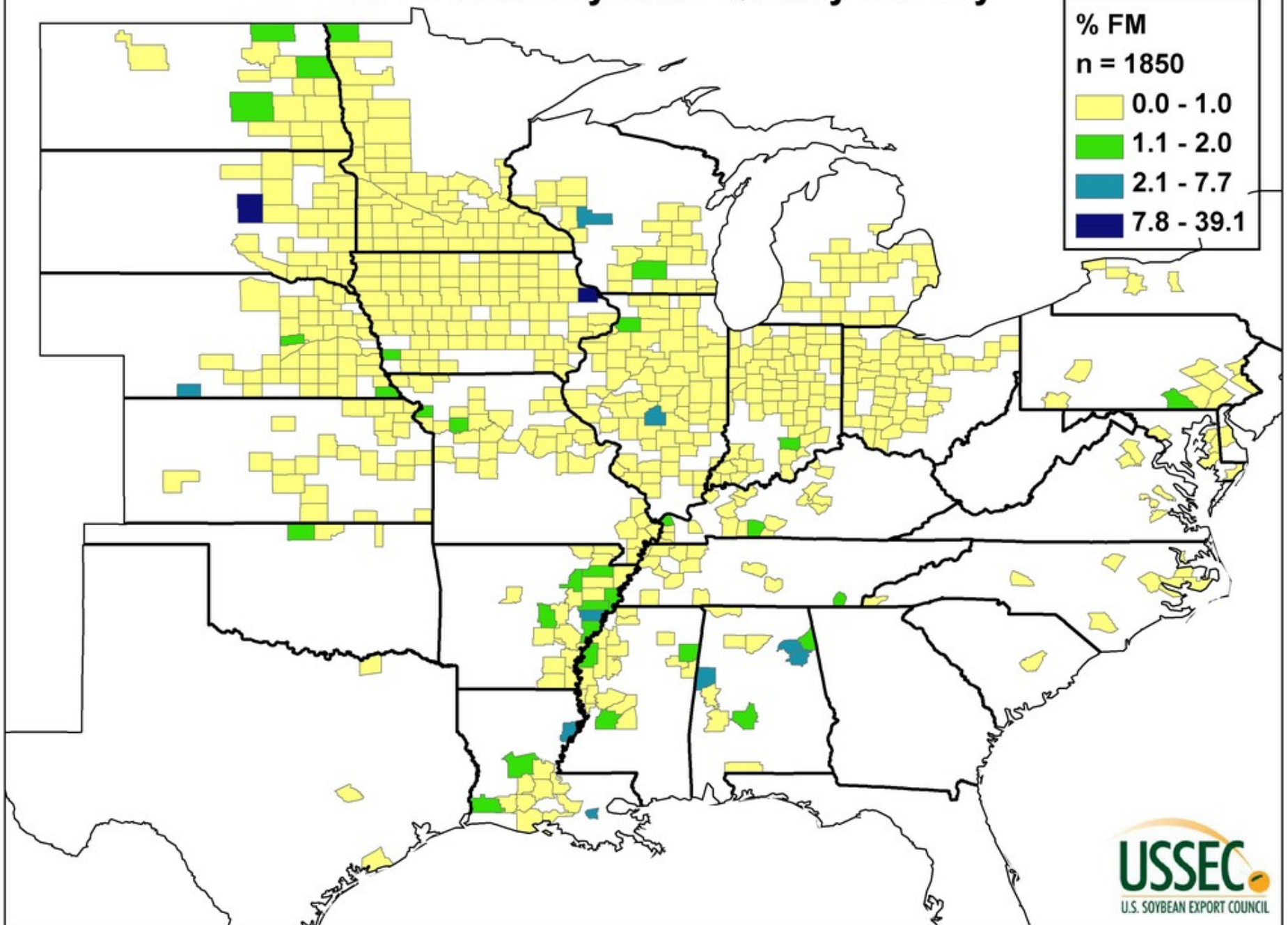


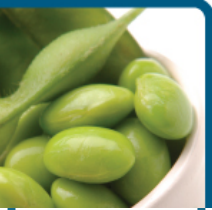
2010 U.S. Soybean Quality Survey





2010 U.S. Soybean Quality Survey





Thank You!



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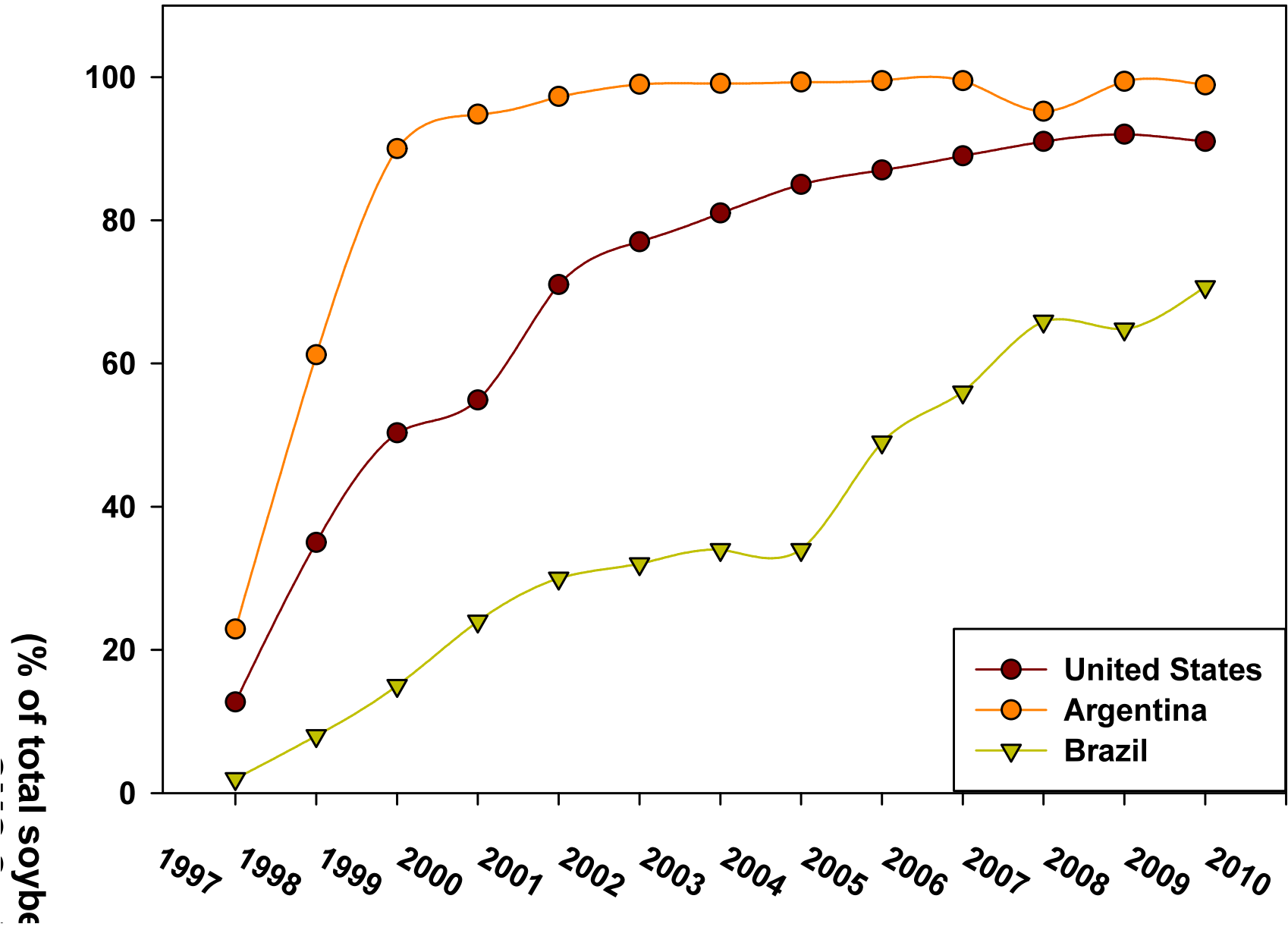


Summary

- The private sector is very large and is primarily focused on development of transgenic traits
- The public sector is focused on germplasm development and non-GMO variety release
- U.S. producers have a renewed interest in supporting non-GMO variety development to provide farmers more choice



GMO Soybean Production By Country





GMO Soybean Production by Country

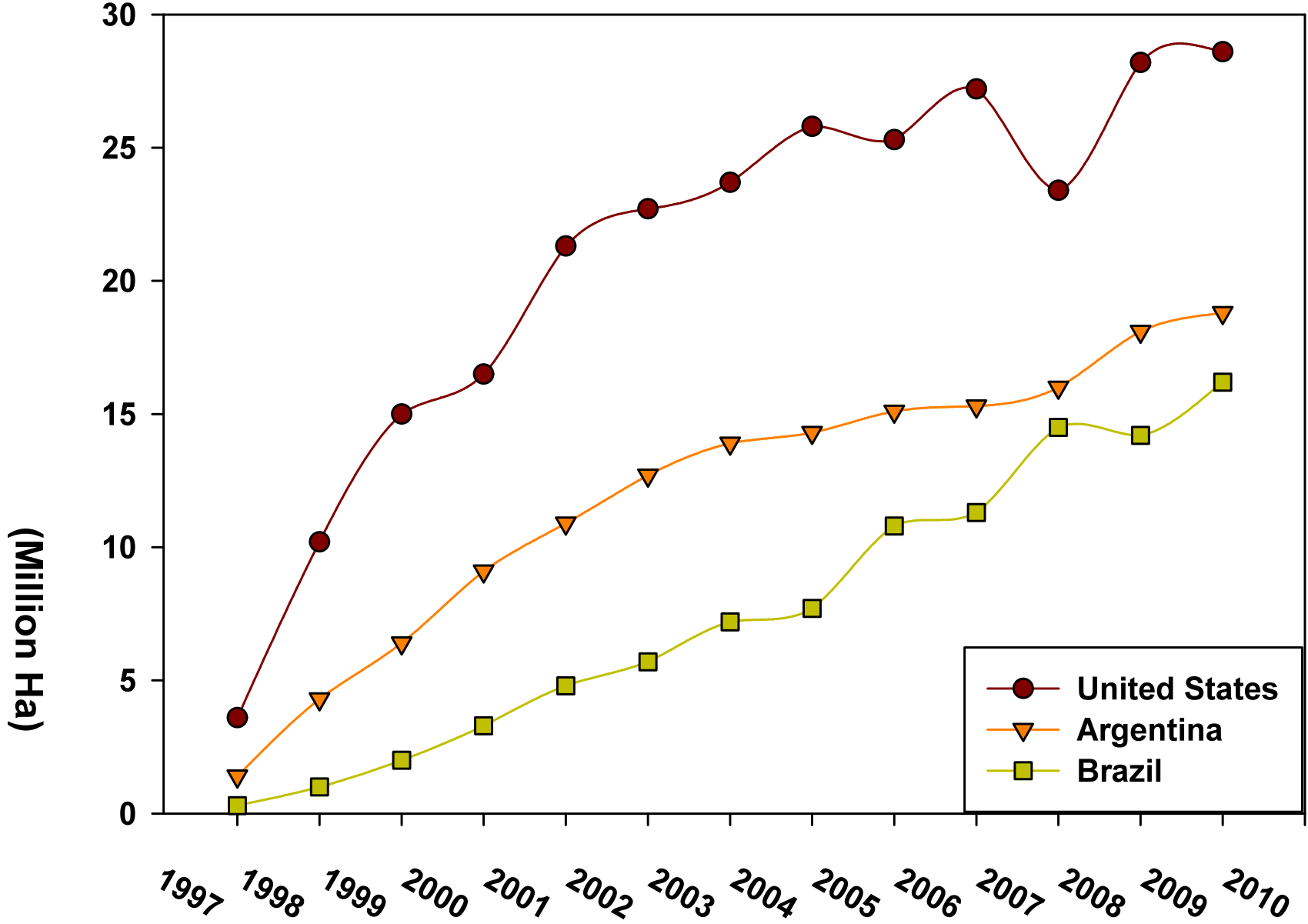




TABLE 12010 U.S. Non-GMO Food Soybean Variety Survey-2009 PUBLIC RELEASES BY TYPE

Variety name or #	Maturity group	End-use application (type)	Average yield (%) relative to comparable end-use check	Protein (13%)	Oil (13%)	Special characteristics	Seed size (g/100 seeds)	Hilum color	Seed available for commercial production? Y/N	Grain supply available for export? Y/N
Gardensoy 51	5.2	Edamame	90% of Cisne			large seed size	26.0	Y	Y	N
MN0606CN	0.6	General purpose	107% of Lambert	34.0	19.3		14.3	Y	Y	
MN0107	0.1	General purpose	110% of Traill	35.2	16.8		15.1	Y	Y	
IAR2101 SCN	1.8	General purpose	116% of IA1008	34.2	19.2	SCN resistance	13.2	BF	Y	N
Deuel	1.1	General purpose	104% of Surge	35.4	17.5	Phytophthora resistance	19.1	BL	Y	
IAR1008BC SCN/Phyto2.0	2.0	General purpose	101% of IA1008	34.6	18.9	SCN and Phyto (<i>Rps1A</i>) resistance	17.9	Y	Y	N
IAR3001 Phyto/SCN	2.8	General purpose	105% of IA3028	35.6	19.6	Phyto (<i>Rps8</i>) and SCN resistance	15.3	BL	Y	N
Davison	2.2	General purpose	96% of IA1022	34.0	18.0	Phytophthora resistance	12.9	IMP BL	Y	
Patriot	3.9	General purpose		37.0	17.3	higher protein	14.0	BL	Y	Y
S05-11482	5.1	General purpose	107% of Jake	34.8	19.7	SCN, root knot nematode res	12.0	BL	Y	Y
S05-11268	5.0	General purpose	103% of TN5002T	35.8	18.7		13.0	BL	Y	Y
IA3048	3	General purpose & Food	103% of comparables in trials	34.6	18.1	SCN		Y		
MN0805SP	0.8	Natto	95% of Sheyenne	38.1	16.4		8.0	Y	Y	
MN0207SP	0.2	Natto	105% of Cavalier	31.2	18.3		6.1	Y	Y	
ND04-10327	0.5	Tofu	100% of ProSoy				16.0	Y	Y	Y
MN1806SP	1.8	Tofu	109% of Vinton 81	38.2	17.4		20.2	Y	Y	
IA3027RA1	3	Tofu				soybean aphid resistance				
IA3045	3	Tofu								
IA3046	3	Tofu								
IA3047	3	Tofu								





TABLE 22010 U.S. Non-GMO Food Soybean Variety Survey-2010 PUBLIC RELEASES BY TYPE

Variety name or #	Maturity group	End-use application (type)	Average yield(%) relative to comparable end-use check	Protein (13%)	Oil (13%)	Special characteristics	Seed size (g/100 seeds)	Hilum color	Seed available for commercial production? Y/N	Grain supply available for export? Y/N
MN0701	0.7	General purpose	101% of Sheyenne	34.6	18.4		15.4	Y	Y	
MN0907	0.9	General purpose	106% of Sheyenne	33.6	19.5		15.9	Y	N	
MN0208CN	0.2	General purpose	115% of Sheyenne (SCN)	36.8	17.0		13.6	Y	N	
MN1013	1.0	General purpose	103% of Lambert	34.9	18.7		12.8	Y	N	
S07-5049	4.1	General purpose	110% AG3905	36.1	19.4	SDS, SCN & root knot tolerant	13.8	BL	y	N
S07-5117	4.8	General purpose		36	19.3	SDS, SCN & root knot tolerant	14.6	BL	y	N
S06-11278	5.1	General purpose	105% 5002T	35.8	18.9	SCN, root knot & frogeye res.	13.5	BF	y	N
S07-2680	5.4	General purpose	106% of Jake	35.7	19	SCN, root knot & frogeye res.	13.5	BF	y	N
MN0093SP	00.9	Natto	112% of Cavalier	31.8	18.7		8.0	Y	N	
MN0501SP	0.5	Natto	100% of Cavalier	34.3	19.2		10.7	Y	N	
ND04-10637	0.3	Natto	115%	34	16		9.6	Y	N	N
MN1012SP	1.0	Natto	95% of Sheyenne	33.5	15.9		7.2	Y	N	
TN03-217	5.3	Natto	85% of commodity high yield check	36.5	16.5	small seeds	7.8	BF	Y	Y
Line 1		Natto								
Line 2		Natto								
MFS-591	5-6	Natto								
MN0094SP	00.9	Tofu	108% of Cavalier	30.5	17.3		20.6	Y	N	



TABLE 3 2010 U.S. Non-GMO Food Soybean Variety Survey—PUBLIC RELEASES NEXT 3 – 5 YEARS BY TYPE

*Variety name or #	Maturity group	End-use application (type)	Average yield (%) relative to comparable end-use check	Protein (13%)	Oil (13%)	Special characteristics	Seed size (g/100 seeds)	Hilum color	Seed available for commercial production? (year)
Multiple releases		Edamame							
SD03-2154	0.7	General purpose	105% of Surge	35.7	19.6	Phytophthora resistance	17.2	GR	2011-2012
MN0908CN	0.9	General purpose		33.9	19.3		11.9	Y	2011
SD04CV-611	0.9	General purpose	102% of Surge	36.7	17		20.8	BL	2012-2013
SD04-CV-613	0.9	General purpose	107% of Surge	36.5	17.1		19.3	IMP BL	2013-2014
SD05-240	1.0	General purpose	98% of IA1022	34.4	18.1	Phytophthora resistance	16.3	BF	2012-2013
D (Missouri)	4.1	General purpose		36	18	larger seed, yellow hila	16-17	Y	
B (Tennessee)	4.9	General purpose	104% of 5002T						2013
C (Tennessee)	5.1	General purpose	105% of 5601T			broad resistance to SCN			2012
M02-385041	1.1	General purpose (SCN)		40.4	20.4		13.3	Y	2013
M03-914036	1.5	General purpose (SCN)		40.0	20.2		13.7	Y	2015
SD05-767	1.0	General purpose, Low-linolenic oil	94% of Surge	37.2	17.5	Low linolenic acid (2.8%)	14.2	IMP BL	2011-2012
>1 potential release		Higher sucrose lines							
C (Missouri)	3.9	High oleic, Low-lin							
A (Missouri)	4.5	High oleic, Low-lin							
B (Missouri)	5.0	High oleic, Low-lin							
M02-349008	0.2	Natto		39.9	17.9		9.1	Y	2013
M02-349053	0.2	Natto		39.0	19.0		8.7	Y	2013
MN1203SP	1.2	Natto		36.5	21.0		9.2	Y	2011
V9S-7456		Tofu							
M02-359041	0.4	Tofu		44.4	19.4		18.9	Y	2014
A (Tennessee)	5.5	Tofu and General purpose	104% of 5601T						2013
A (Arkansas)		Tofu, large-seeded							2011-2012
SD00-1501	0.8	Tofu, Soy milk, etc	92% of Surge	39.5	16.6		18.9	BR	2011-2012

* Alphabetized if name/number unknown

2010 U.S. Non-GMO Food Soybean Variety Survey-*PUBLIC RELEASE TALLY BY STATE*

Year	State	Number of Releases	End-use Application (Type)
2009	Iowa	4	General purpose
		4	Tofu
	Illinois	1	Edamame
	Minnesota	2	General purpose
		2	Natto
		1	Tofu
	Missouri	3	General purpose
	North Dakota	1	Tofu
	South Dakota	2	General purpose
2010	Arkansas	2	Natto
	Minnesota	4	General purpose
		3	Natto
		1	Tofu
	Missouri	4	General purpose
	North Dakota	1	Natto
	Tennessee	1	Natto
	Virginia	1	Natto
	3-5 years	Arkansas	1
Michigan		>1	Edamame
Minnesota		3	General purpose
		3	Natto
		1	Tofu
Missouri		1	General purpose
		3	High oleic, Low-lin
South Dakota		4	General purpose
		1	General purpose, Low-linolenic oil
		1	Tofu, Soymilk, etc
Tennessee		2	General purpose
		1	Tofu, General purpose
Virginia	1	Higher sucrose line	
	1	Tofu	





TABLE 4 2010 U.S. Non-GMO Food Soybean Variety Survey *2009 PRIVATE RELEASES BY TYPE*

Variety name or #	Maturity group	End-use application (type)	Average yield (%) relative to comparable end-use check	Protein (13%)	Oil (13%)	Special characteristics	Seed size (g/100 seeds)	Hilum color	Seed available for commercial production? Y/N	Grain supply available for export? Y/N
eMerge 289.TC	2.8	General Purpose	112% of P92M72	36.1	19.7	High Yield	17.2	BL	Y	Y
eMerge 389F.YC	3.6	Tofu	110% of P93B82	37.0	18.3	Medium protein YHC, high tofuyield	16.7	Y	Y	Y

TABLE 5 2010 U.S. Non-GMO Food Soybean Variety Survey 2010 PRIVATE RELEASES BY TYPE

Variety name or #	Maturity group	End-use application (type)	Average yield (%) relative to comparable end-use check	Protein (13%)	Oil (13%)	Special characteristics	Seed size (g/100 seeds)	Hilum color	Seed available for commercial production? Y/N	Grain supply available for export? Y/N
EX 05271	2.7	General Purpose	107.2% OF 6 competitive chks. intest	36.3	17.1		15.4	BR	2011	2012
XC3810	3.8	General Purpose	111% of P93B82	37.5	18	High yield	16	BL	Y	Y
XC4310	4.3	General Purpose	107% of 435.TCS	37	19.5	High yield	17.5	BL	Y	N
XC4410	4.4	General Purpose	109% of 435.TCS	36.5	20	High yield	16	BL	Y	N
XC4510	4.5	General Purpose	108% of 435.TCS	36.7	20	High yield	17	BL	Y	N
XC4910	4.9	General Purpose	109% of UA4805	37	19.3	Large seeded	19.5	BL	Y	N
XC5110	5.1	General Purpose	110% of Jake	37.5	19.5	Large seeded	20.9	BL	Y	N
EX 09202	2.0	Tofu	107.1% OF IA 1022 and IA 1008	36.2	17.3	Good iron deficiency tolerance	22.1	Y	2011	2012
XP3520	3.5	Tofu	108% of P93B82	39	17.8	Excellent tofu yield with high protein	18	BL	Y	Y
XY2310	2.3	Tofu	103% of P92M10	38	18.6	YHC and good seed size	19	Y	N	N
XY2510	2.5	Tofu	105% of P92M10	38.5	18.3	YHC and good seed size	19.6	Y	N	N
XD2810	2.8	Tofu	109% of P92M72	38	19	High Sucrose, med. protein	16	BL	Y	Y
XD3210	3.2	Tofu	106% of A3555	38	19	High Sucrose, med. protein	16	BL	Y	Y
XY3510	3.5	Tofu	106% of P93B82	38.5	18.5	High Protein YHC	20.5	Y	Y	N
XP4520	4.5	Tofu	111% of 448F.HPC	40	18	High protein	18.5	BL	Y	Y
possible new var. 1	3.5	Tofu or soy milk	103% of OH checks					Y	Y	Y
possible new var. 2	3.5	Tofu or soy milk	103% of OH checks			P+O > 65% DM basis		IMPBL	Y	Y
*0200-0	0.2			34.6	19.0			GR		
*0500-0	0.5			35.3	19.5			IMPBL		
*1700-0	1.7			36.0	18.1			BL		
*2000-0	2.0			34.5	20.3			BR		
*3400-0	3.4			34.8	19.5			BL		
*3900-2	3.9			39.3	22.0			BL/BR		
*4300-2	4.3			37.0	19.8			BL		
*4400-2	4.4			35.2	20.9			BL		
*4500-2	4.5			35.9	20.3			BL		
*4800-2	4.8			35.4	20.9			BL		
*5400-0	5.4			36.8	19.8			IMPBL		
*DSR-2215	2.2					strong SCN field resistance, PRR res.		BL		
*DSR-2400	2.4					BSR & PRR res.	large	Y		

* Date from company website, not from a completed survey



TABLE 7 2010 U.S. Non-GMO Food Soybean Variety Survey—*PRIVATE RELEASE TALLY BY STATE*

Year	State	Number of Releases	End-use Application (Type)
2009	Iowa	1	General purpose
		1	Tofu
2010	Iowa	6	General purpose
		7	Tofu
		11	Unknown (data from company website, not completed survey)
	Minnesota	1	General purpose
		1	Tofu
	Ohio	2	Tofu or Soymilk
Wisconsin	2	Unknown (data from company website, not completed survey)	
3-5 years	Iowa	1	General purpose
		3	Tofu
		1	Tofu and Soymilk
		9	Yellow hilum tofu and soymilk
	Minnesota	2	General purpose
		1	Tofu
		3	Not given