
Soybean Agronomy
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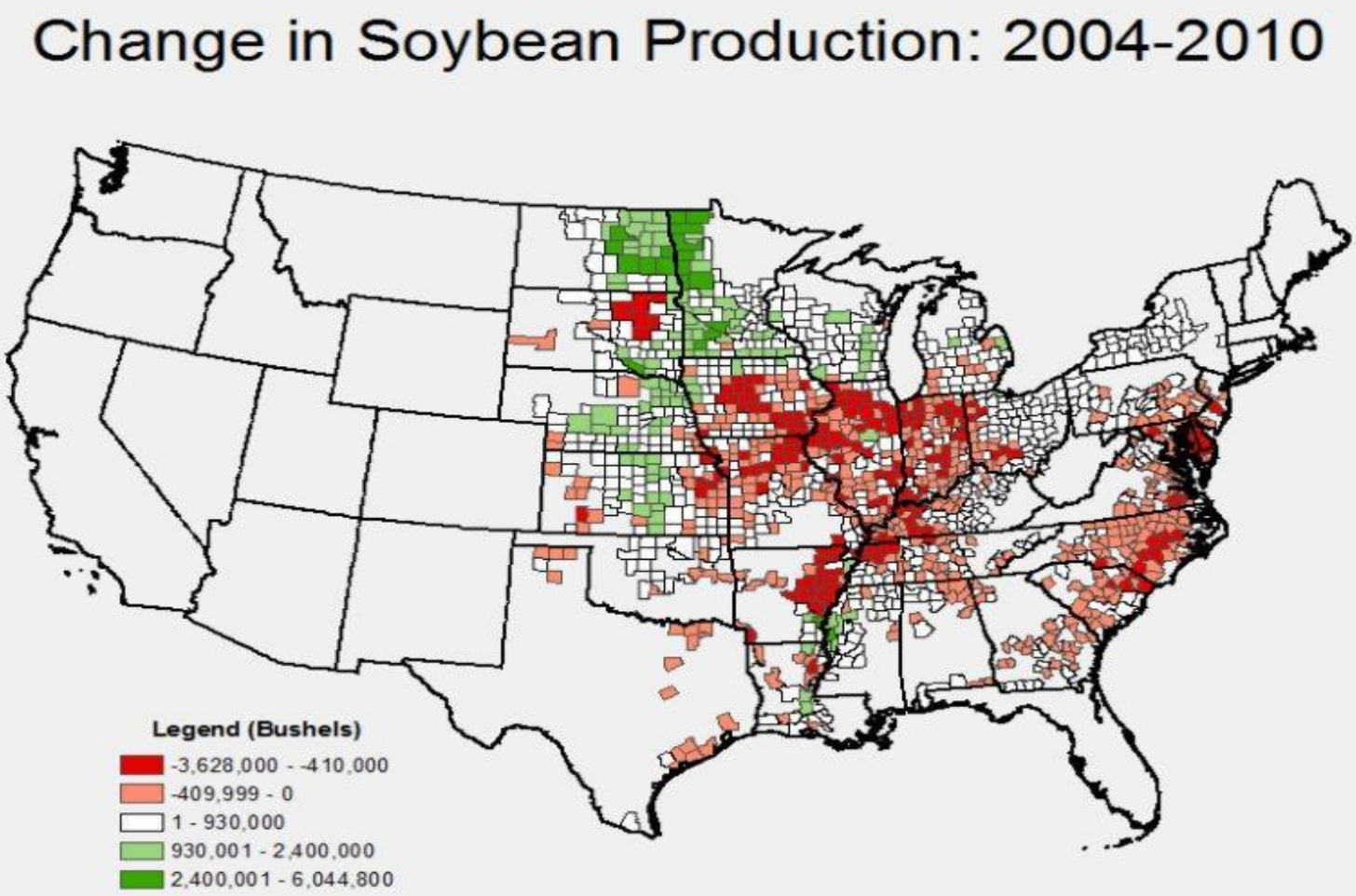
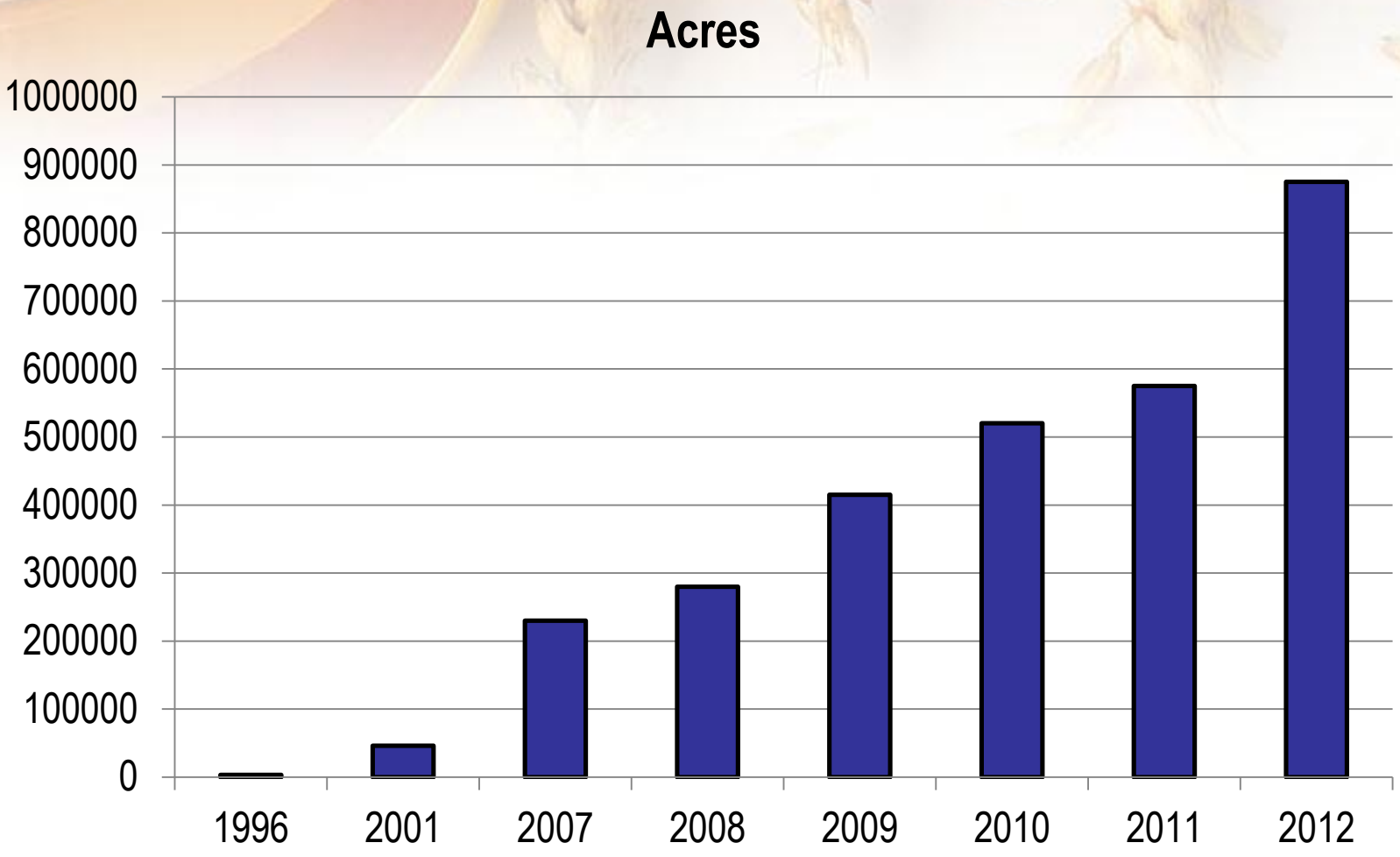
Soybeans Production Shifting

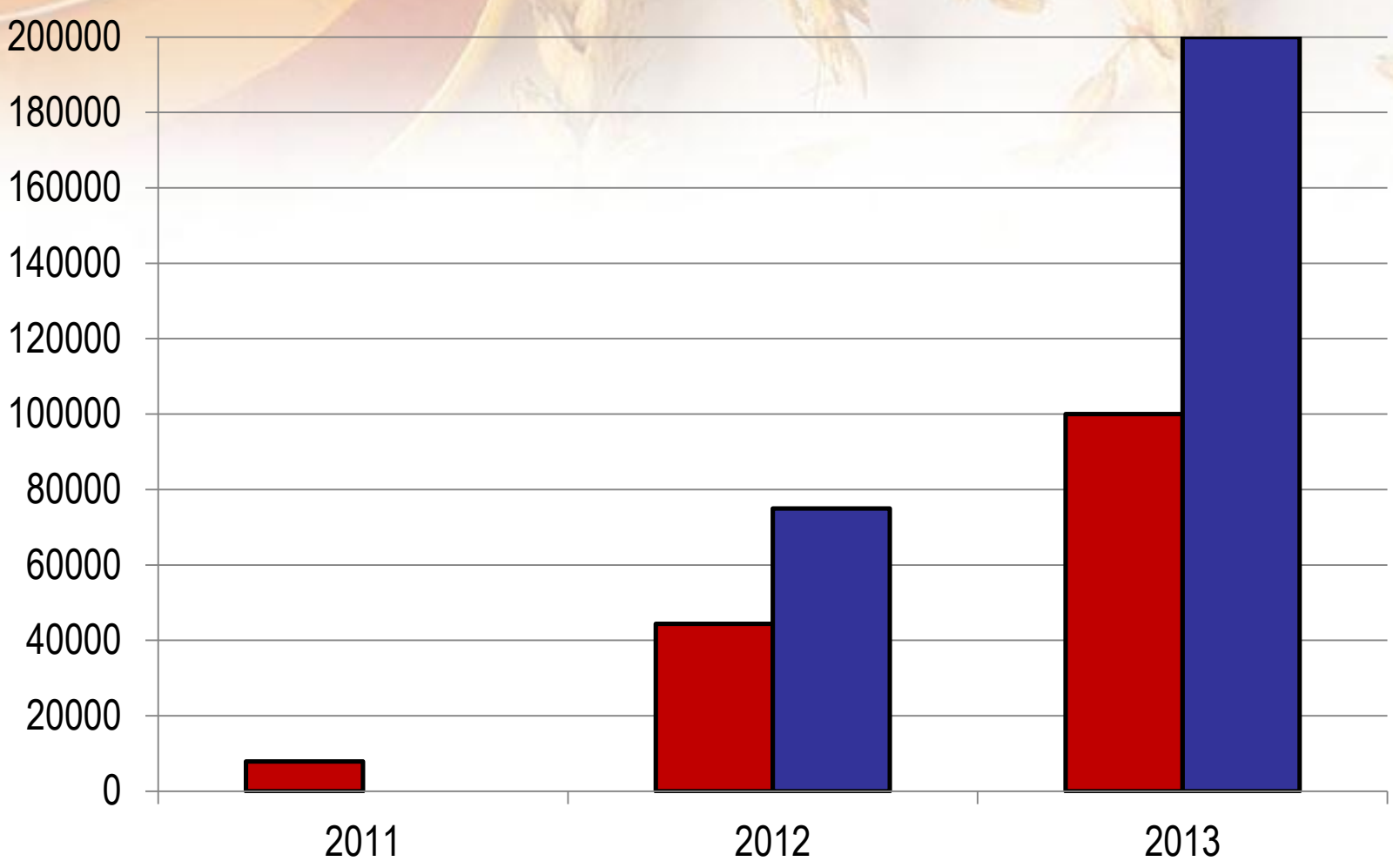


Manitoba Soybean Acreage



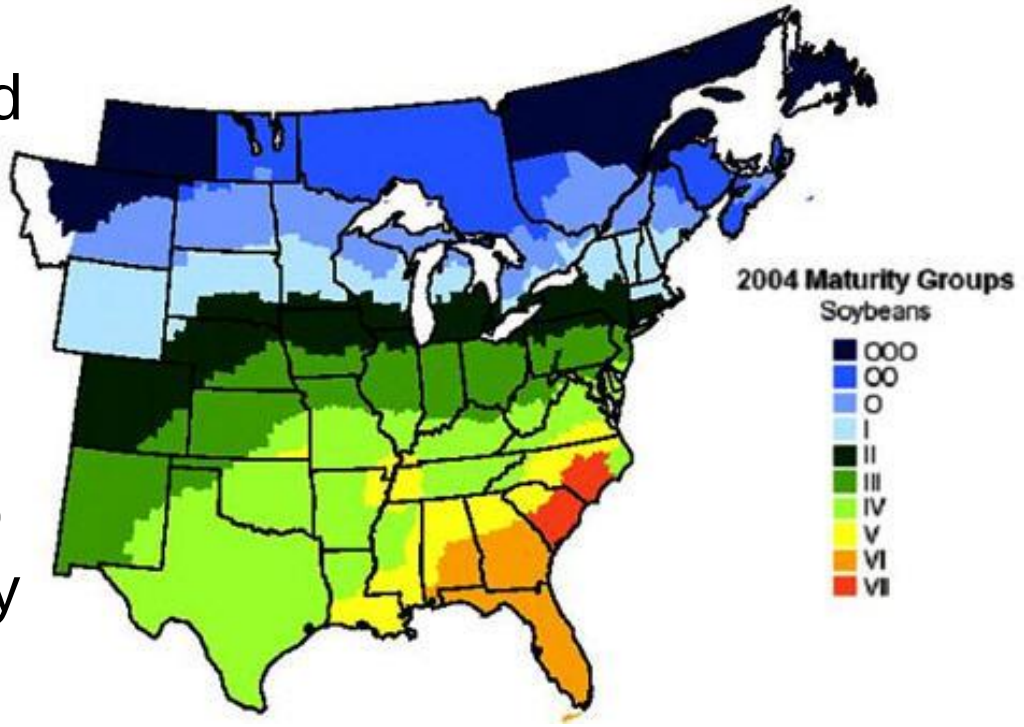
Source: Stats Canada; AAFC; MAFRI

Saskatchewan Soybean Acreage

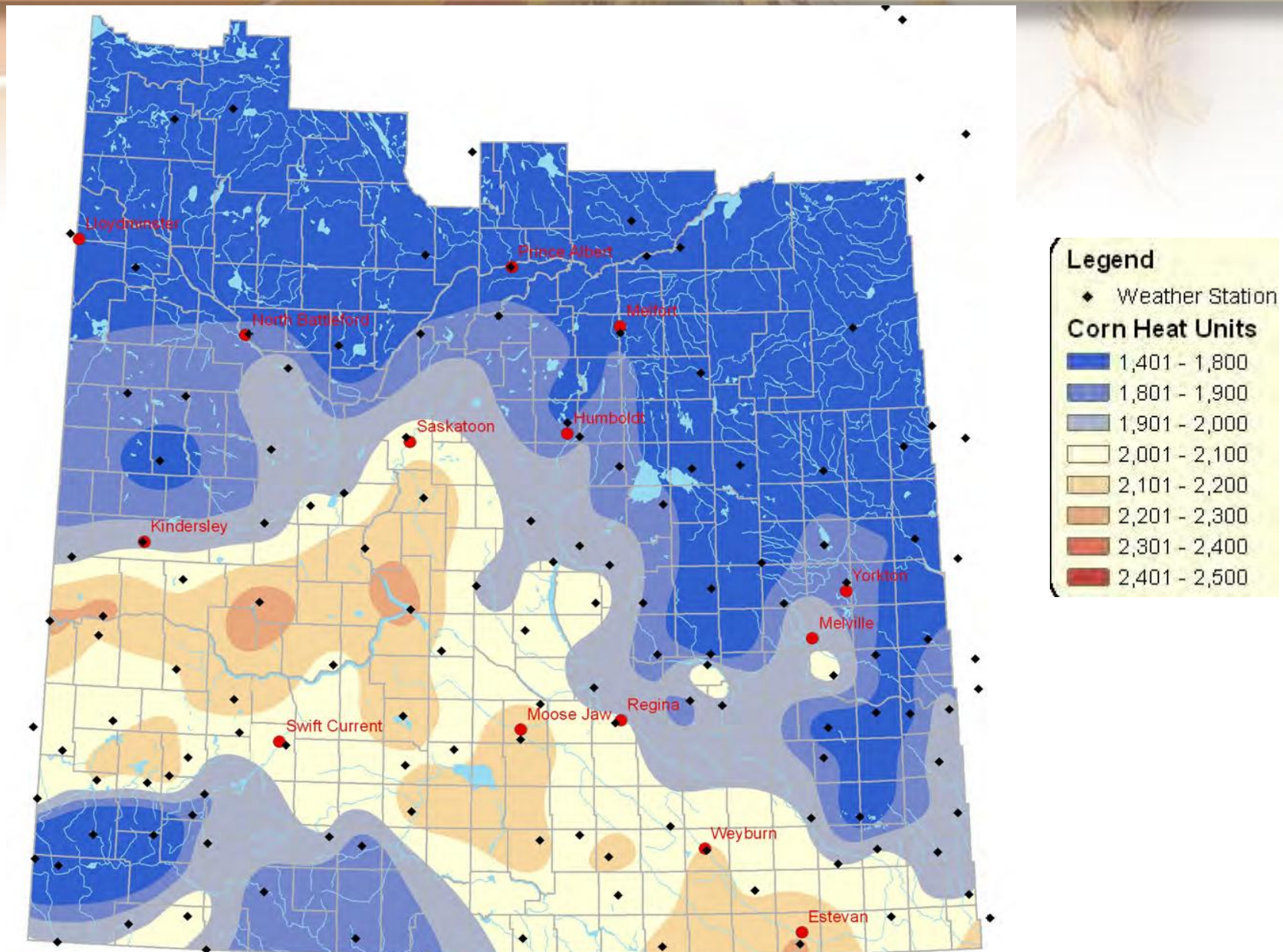


Plant Maturity: Photosensitivity

- Soybeans are **photosensitive**
  - Begin to produce flowers when a critical dark period is reached (day length)
- Day length varies with latitude
- Soybeans were divided into types or groups according to their maturity/photosensitivity
- Soybeans are now divided into 13 groups
  - MG 000 to MG X



Saskatchewan Corn Heat Units



Soybean Pre-2012

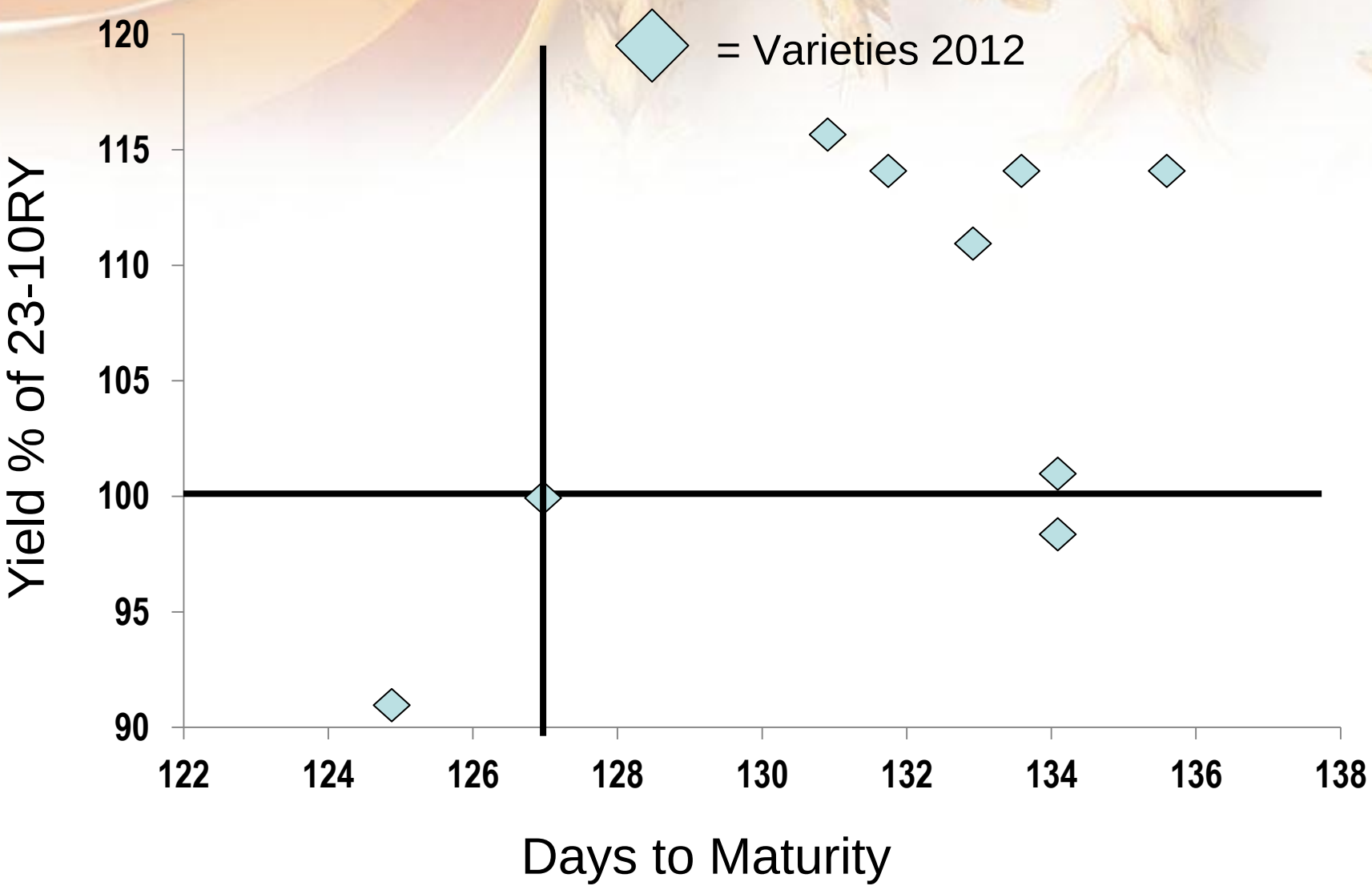
Variety	Site Years	Yield as % of RR Rosco	Corn Heat Units*	Height (cm)	Lodge Rating	Seed Weight (g/1000)	Hilum Colour
Apollo RR	9	110	2375	75	VG	139	BR
NSC Warren RR	6	110	2375	79	VG	136	BR
LS 0036RR	6	106	2425	71	VG	129	BR
RR Rosco	9	100	2450	76	G	148	IY
Isis RR	4	92	2400	79	VG	136	BR
NSC Argyle RR	4	90	2450	73	G	140	BR
LS 0028RR	4	89	2400	62	VG	114	BR

New - Soybean 2012

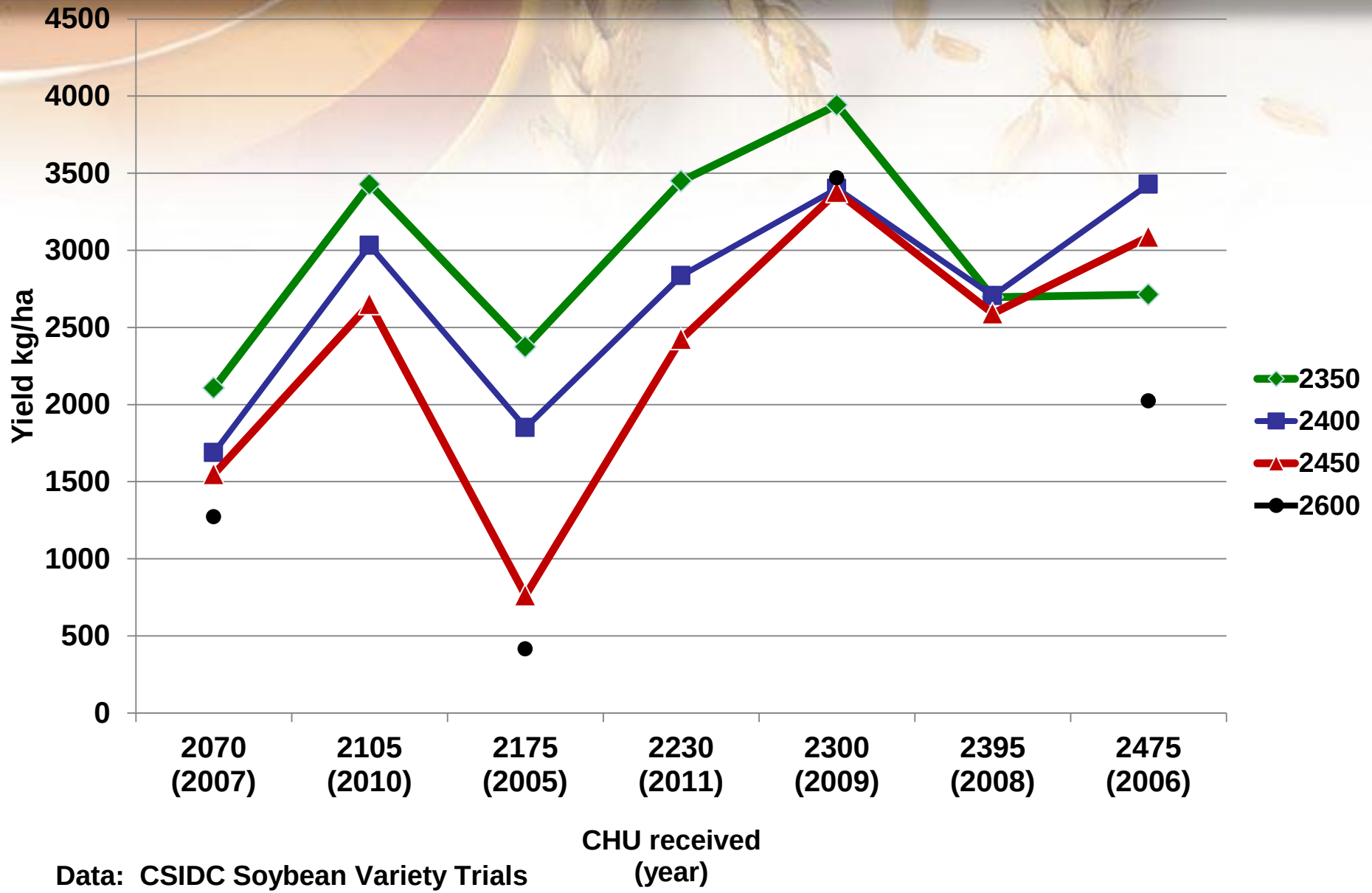
Varieties appear 10% or > Higher Yielding than most Pre-2012 Entries

TH 32004R2Y	RR2	4	116	2425	131	82	VG	205	BL
Sampsa RR	RR2	4	114	2425	132	79	VG	207	IB
24-10RY	RR2	4	114	2425	134	81	VG	207	IB
004R21	RR2	4	114	2425	136	84	VG	203	BL
HS 006RYS24	RR2	2	111	2450	133	NA	VG	207	BL
900Y61	RR1	4	101	2425	134	81	VG	203	BR
23-10RY	RR2	4	100	2325	127	79	VG	204	IY
900Y71	RR1	4	98	2450	134	80	VG	202	IY
Pekko R2	RR2	4	91	2325	125	83	VG	204	BL

Varieties 2012: Yield vs Maturity



Yield vs Variety CHU Rating



Data: CSIDC Soybean Variety Trials

Soybean Establishment

- Treat seed gently, avoid multiple handling especially if seed moisture is low (< 13%)
- Requires good seedbed moisture, seed needs to absorb 50%+ its seed weight to initiate germination
- Seed will swell at 5°C but embryo will not grow until soil temperature is 9°C
- Seeding Date – when soil temperature at depth of seeding = 10°C
- Afternoon planting

Soybean Establishment

Soybeans planted in warm soil (21º) and kept at that temp
For 17 days.

Courtesy NorthStar Genetics

Soybean Establishment

Soybeans planted in warm soil (21º) for 8 hours, then kept at 7º for 4 days

Courtesy NorthStar Genetics

Soybean Establishment

Soybeans planted in cool soil (7°C) and kept at 7°C for 20 hours then warmed up to 21°C for 17 days (“cold shock”)

Courtesy NorthStar Genetics

Soybean Establishment

- Use a seed treatment, will assist in cold soils and protect from seed rot/seedling loss (research indicates an economic benefit in northern growing regions)
- Seeding depth = ¾” to 1.5” (sensitive to deep seeding)
- Roll if stones present or uneven ground
  - Roll prior to emergence
  - If delays in rolling occur (compaction concerns, weather) wait and roll at the 1st or 2nd trifoliate stage

Soybean Establishment

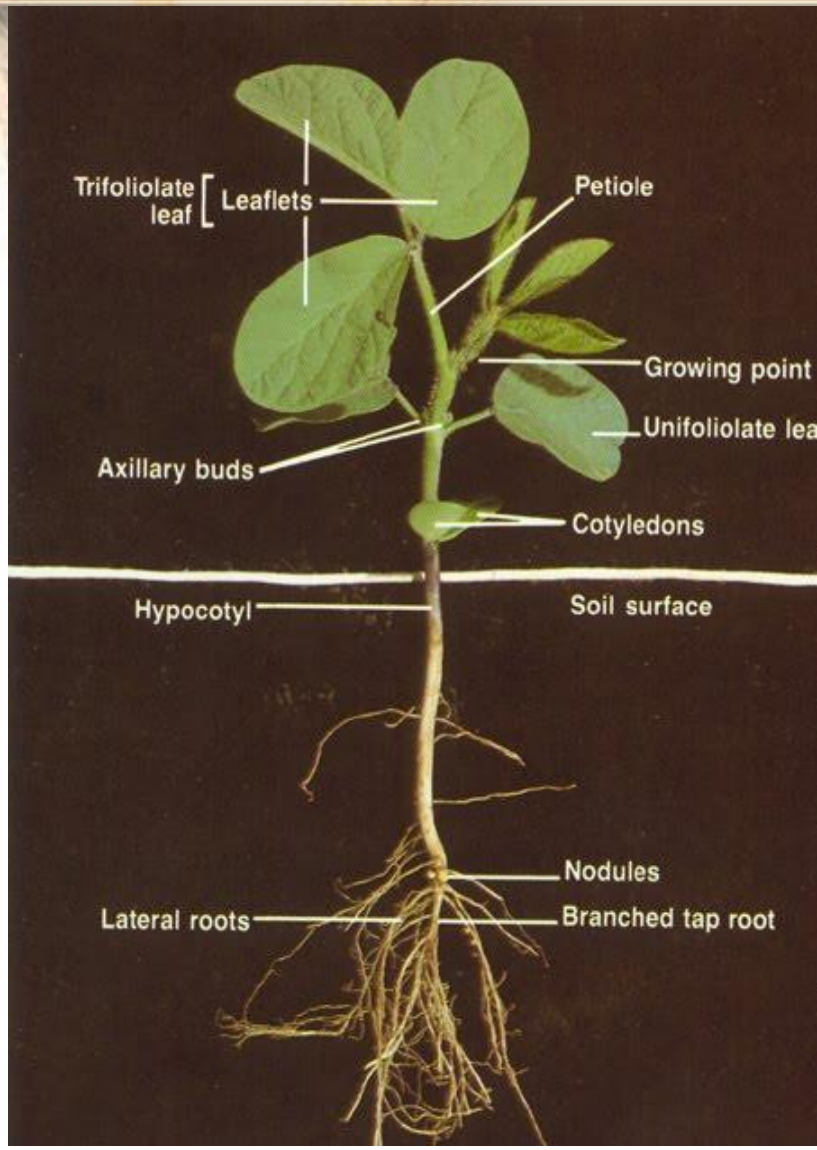
- Seeding rate (irrigated production)
  - ≈180,000 plants/ac solid seeded (9-12’)
  - ≈160,000 plants/ac row cropped (22”)
  - Varieties differ in seed weight (2200 – 3000 seed/lbs), calibrate seeder accordingly
  - Plants adjust to lower planting density by increasing branching and the number of pods on branches and main stem
    - < elastic in yield than canola
    - > maturity

Soybean Establishment

SEEDS PER POUND	DESIRED SEEDS PER ACRE								
	140,000	150,000	160,000	170,000	180,000	190,000	200,00	210,000	220,000
	SEEDING RATE POUNDS PER ACRE								
2,500	56	60	64	68	72	76	80	84	88
2,600	54	58	62	65	69	73	77	81	85
2,700	52	56	59	63	67	70	74	78	81
2,800	50	54	57	61	64	68	71	75	79
2,900	48	52	55	59	62	66	69	72	76
3,000	47	50	53	57	60	63	67	70	73
3,100	45	48	52	55	58	61	65	68	71
3,200	44	47	50	53	56	59	63	66	69
3,300	42	45	48	52	55	58	61	64	67
3,400	41	44	47	50	53	56	59	62	65
3,500	40	43	46	49	51	54	57	60	63
3,600	39	42	44	47	50	53	56	58	61
3,700	38	41	43	46	49	51	54	57	59
3,800	37	39	42	45	47	50	53	55	58
3,900	36	38	41	44	46	49	51	54	56
4,000	35	37	40	43	45	48	50	53	55
4,100	34	36	39	41	44	46	49	51	54

Soybean Establishment

- Spring Frost
  - Soybean growing point emerges above ground so susceptible to frost
  - Axillary buds develop at cotyledons and each leaf axil, so recovery possible
  - If frost extends below cotyledons plant death occurs
- Fall Frost
  - If mature then no loss in yield or quality
  - If before maturity then yield loss, green seeds, lower quality and variable moisture



Pod Clearance

Increased Clearance
- Warm soils
- Quick emergence
- Shallow seeding
- Higher seeding rate
- Seed treatment

Decreased Clearance
- Cold soils
- Slow emergence
- Deep seeding
- Low seeding rate
- No seed treatment

Fertility

- Inoculation Critical
  - No native bacteria present
    - Maximum rate (or >) of a seed applied peat or liquid soybean inoculant
    - If capable use in conjunction with full rate (or >) of granular soybean inoculant

Fertility

- Phosphorus
  - Very effective soil P scavenger
  - Sensitive to seed placed fertilizer (salt effect), position P away from seed if possible, limit to 15-20 lbs. P_2O_5/ac if good soil moisture
  - Fall or spring broadcast or band applications
  - Side band applications
  - Additional P applied to proceeding crop
- K, S and micro's unlikely required

Pest Control

- Weeds – soybean is a poor competitor in early growth
  - RR Varieties (95% MB acreage)
    - Pre-seed burn-off
    - Post-emergent applications at unifoliate stage to 3rd trifoliate
    - Later application depending on weed pressure
    - Conventional chemistry if volunteer RR canola an issue
    - Spray in warm conditions while plants actively growing
  - Conventional Varieties
    - Consult “Guide to Crop Protection”

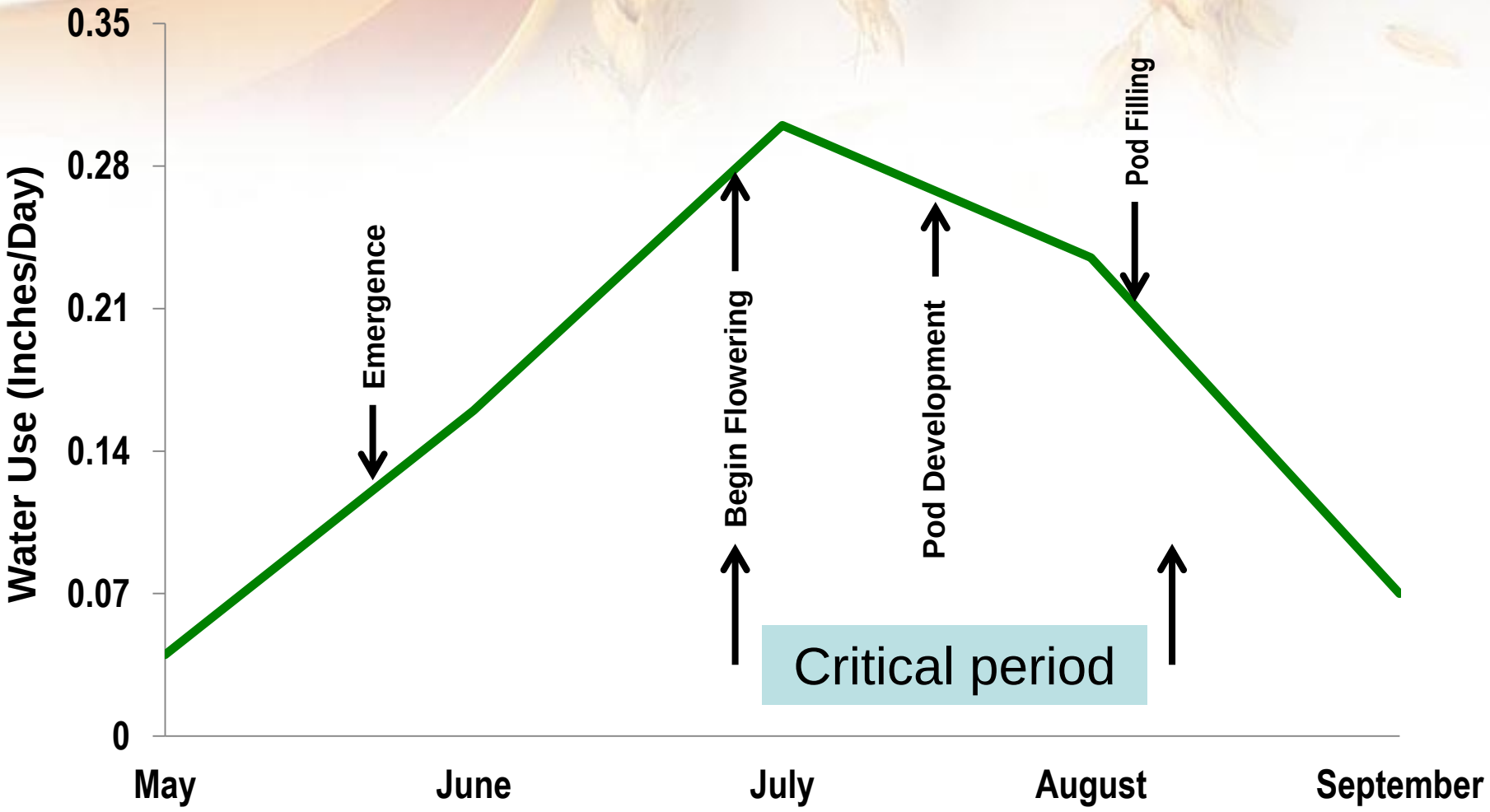
Pest Control

- Disease
  - Use a seed treatment (we are seeding into cool conditions)
    - Soybean affected by pythium, rhizoctonia and fusarium like canola and peas
  - Sclerotinia (scout fields and be prepared to apply fungicide if disease conditions warrant)
- Insects
  - Wireworms
  - Grasshoppers

Irrigation

- No irrigation recommendations or scheduling yet developed for SK
- Soybeans handle “wet feet” better than other pulse or oilseed
- Maintain soil moisture during vegetative growth to avoid drought but US experience & research indicates no appreciable yield advantage above that from irrigation applied only during reproductive development

Estimated Water Requirements



Adapted from C. Duand, NorthStar Genetics

Maturity & Harvest

- Plants mature when 95% of pods have turned “buckskin,” seed rattles in pod
- Your likely going to be waiting for a killing frost
- Can be combined at 20% moisture but better to allow dry down to ≈ 14%
- Pods do not easily shatter and lodging likely not to be a concern
- Leave beans to later if you have a more weather vulnerable crop to deal with

Harvest

- Slower cylinder speeds and wider concave settings reduce internal cracking
- Flex header ideal (air assist reel a bonus)
- Splits and cracks not as big an issue in marketing as other crops (allowed ≈ 15% split/cracked and 5% green seed
- Monitor harvest loss (4 seeds/ft^2 = 1 bushel/ac)
- Store at 13% seed moisture (11% over winter storage)

Conclusions

- 1st Soybean Crop
  - Limit acreage
  - Start with lower CHU, 000 maturing varieties
  - Calculate seeding rate by target population and adjust for seed weight and germination
  - Use a seed treatment and double inoculate (ensure seed treatment and seed inoculant are compatible – check planting window)
  - Wait to soil temperature reaches 10° C
  - Patience required for maturity….go fall fishing!

Thank You