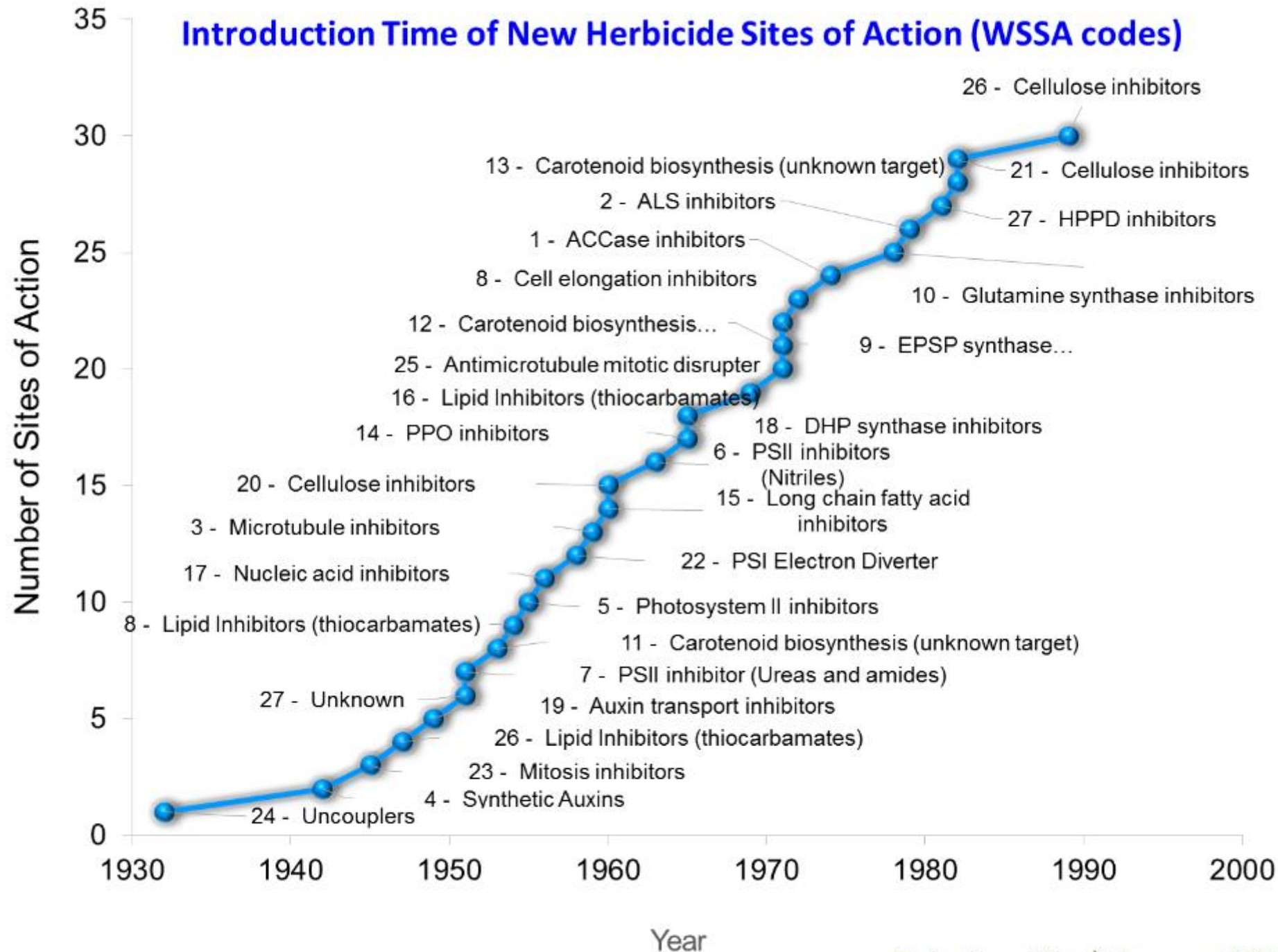




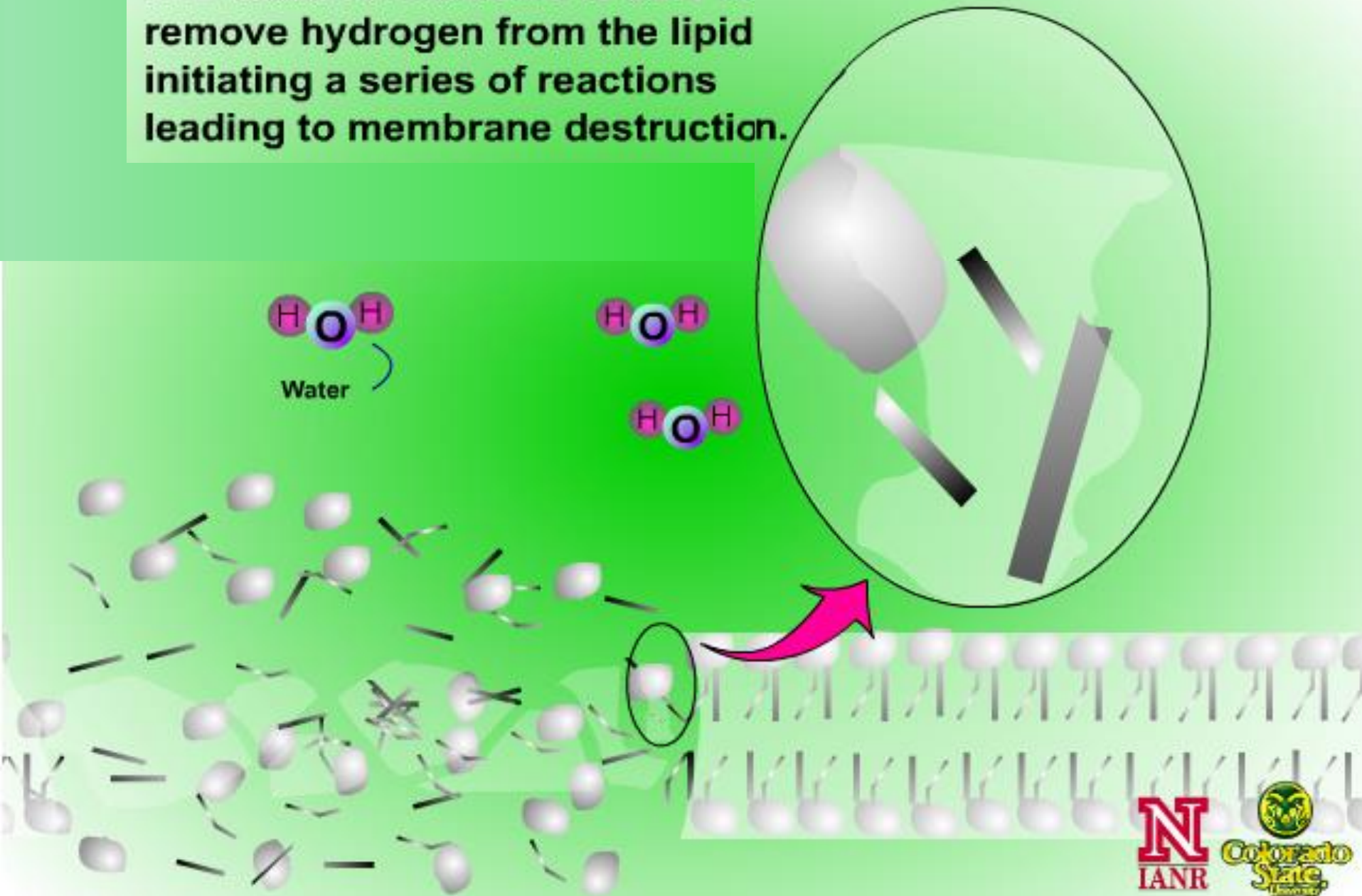
Including Group 14 and 15 Modes of Action in Weed Management Programs

Eric Johnson, Brian Beres and Chris Willenborg

Introduction Time of New Herbicide Sites of Action (WSSA codes)



The reactive molecule is able to remove hydrogen from the lipid initiating a series of reactions leading to membrane destruction.



Group 14 Symptoms

- Effected plants initially have a “watersoaked” appearance, followed by rapid wilting and “burning,” or leaf speckling and browning. Plant death occurs within a few days.



Group 14 Foliar Applied Herbicides

Chemical	Trade Name	Soil Residual	Half-Life (Days)
Pyraflufen-ethyl	Goldwing (+MCPA), Blackhawk (+2,4-D)	None	<1day
Carfentrazone	CleanStart, Conquer (+Bromoxynil)	None	1.5
Saflufenacil	Heat, Sharpen	Short-term (2-3 weeks)	15-28

Group 14 Soil Applied Herbicides

Chemical	Trade Name	Soil Residual	Half-Life (days)
Flumioxazin	Valtera, Chateau	~ 4 weeks	12-18
Sulfentrazone	Authority Authority Charge (+ Carfentrazone)	Season long	21-111**

** From studies on Saskatchewan soils by Szmigielski et al.

Pyraflufen-Ethyl

- Fast acting
 - Appears to be synergism between foliar Group 14's and phenoxy herbicides
- BlackHawk (+2,4-D ester)
 - Pre-seed wheat (spring, durum, winter), barley, rye
 - Soybean – 7 days prior to seeding
 - Chemfallow

Pyraflufen-Ethyl

- Goldwing (+ MCPA ester)
 - Pre-seed field pea
 - Pre-seed wheat (spring, durum, winter), barley, rye, oats, triticale, canary seed, corn (field, sweet)
 - Flax and other pulses to be added to label this year

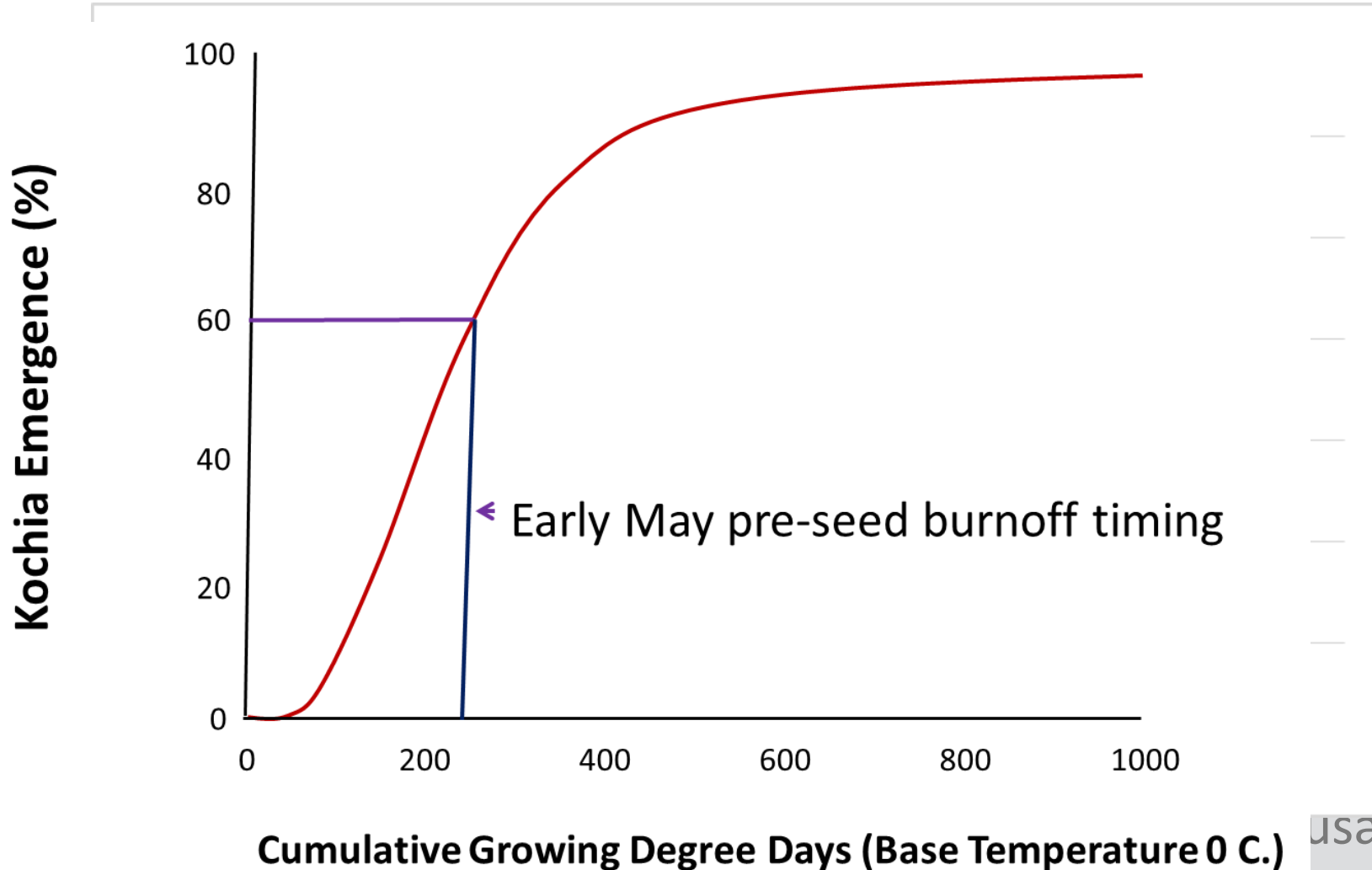
Conquer (bromoxynil + carfentrazone)

- 2 modes of action
 - Can be applied prior to canola
 - Improved control of volunteer canola than carfentrazone alone.

Flumioxazin (Valtera, Chateau)

- Fall / spring
 - Soybean, Field pea, chickpea
 - Wheat – 7 days prior to seeding
- Potatoes
 - Apply after hilling
- Fall applied prior to lentil registration being pursued

Fall applied Valterra – Weed Control Saskatoon and Scott, 2014-15



- Valtera effective dry bean desiccant but how about lentils?
 - 3-year study at Scott and Saskatoon investigated glyphosate, pyraflufen-ethyl, flumioxazin, saflufenacil, glufosinate, and diquat.
 - Ranking: glufosinate = diquat > saflufenacil > flumioxazin > pyraflufen.
 - Addition of glyphosate to saflufenacil, flumioxazin + pyraflufen improved desiccation compared to either product applied alone.

Sulfentrazone (Authority, Authority Charge)

Source: Jenks, NDSU

Untreated



Sulfentrazone



**Sulfentrazone +
Carfentrazone**



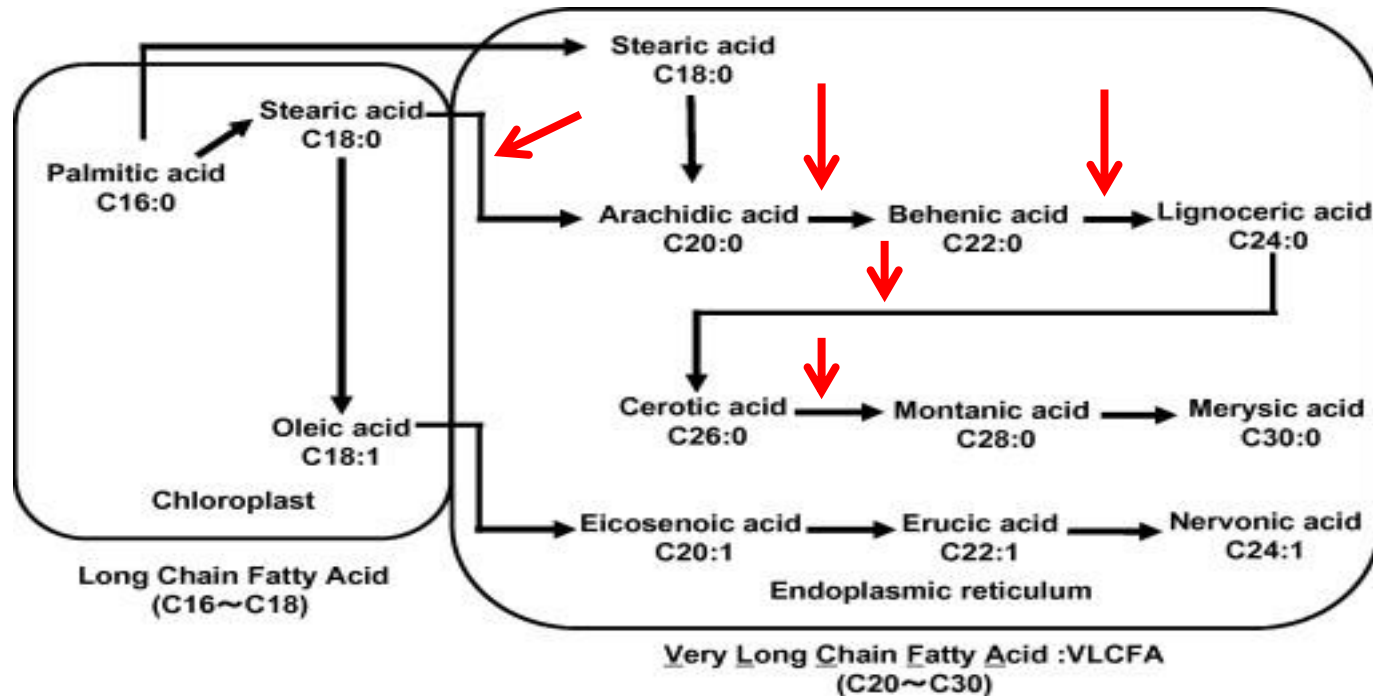
**Sulfentrazone +
Carfentrazone +
AMS + MSO**



Group 15 Soil Applied Herbicides

Inhibitors of Very Long Chain Fatty Acids

Chemical	Trade Name	Registered on:
Pyroxasulfone	Focus (+ carfentrazone)	Wheat (spring, winter, not durum), soybean, corn
Dimethanamid-P	Frontier Max	Corn, dry beans
S-metolachlor	Dual II Magnum	Corn, soybeans, dry beans, potatoes, soybean, lupins



Biosynthetic pathway of VLCFAs in plants.

Source: Yoshitaka Tanetani , Koichiro Kaku , Kiyoshi Kawai , Tomonori Fujioka , Tsutomu Shimizu
Pesticide Biochemistry and Physiology Volume 95,
Issue 1 2009 47 - 55

Group 15 – Focus (pyroxasulfone)

- Do not affect seed germination but have a potent effect on shoot formation in the emerging seedling.



Pyroxasulfone symptoms

- Weeds fail to emerge
- If emerged, monocots appear twisted and malformed / crinkled



Pyroxasulfone symptoms

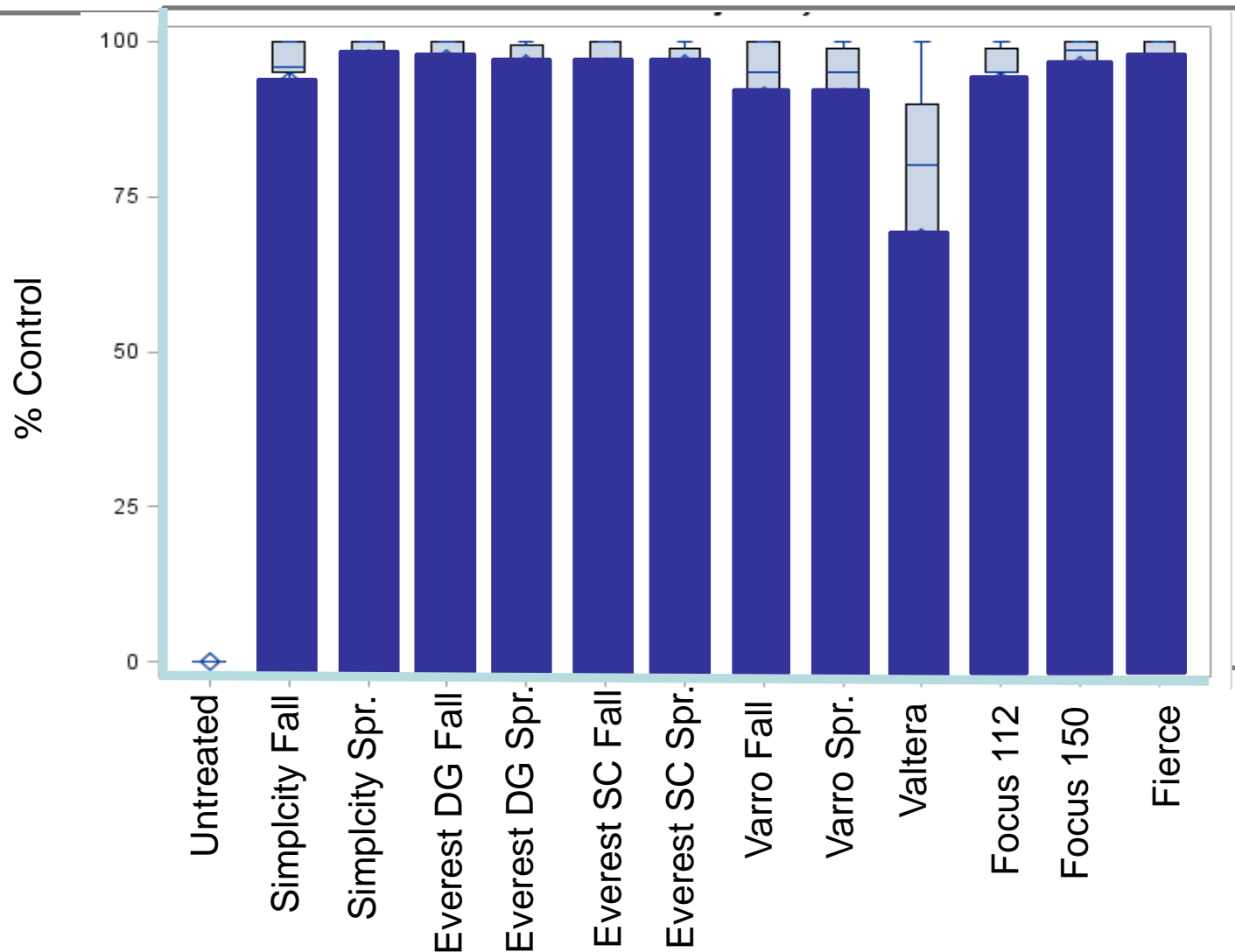
- Broadleaf seedlings that emerge
 - Cupping, crinkling
 - Shortened leaf midribs produce a drawstring effect on leaf tip.



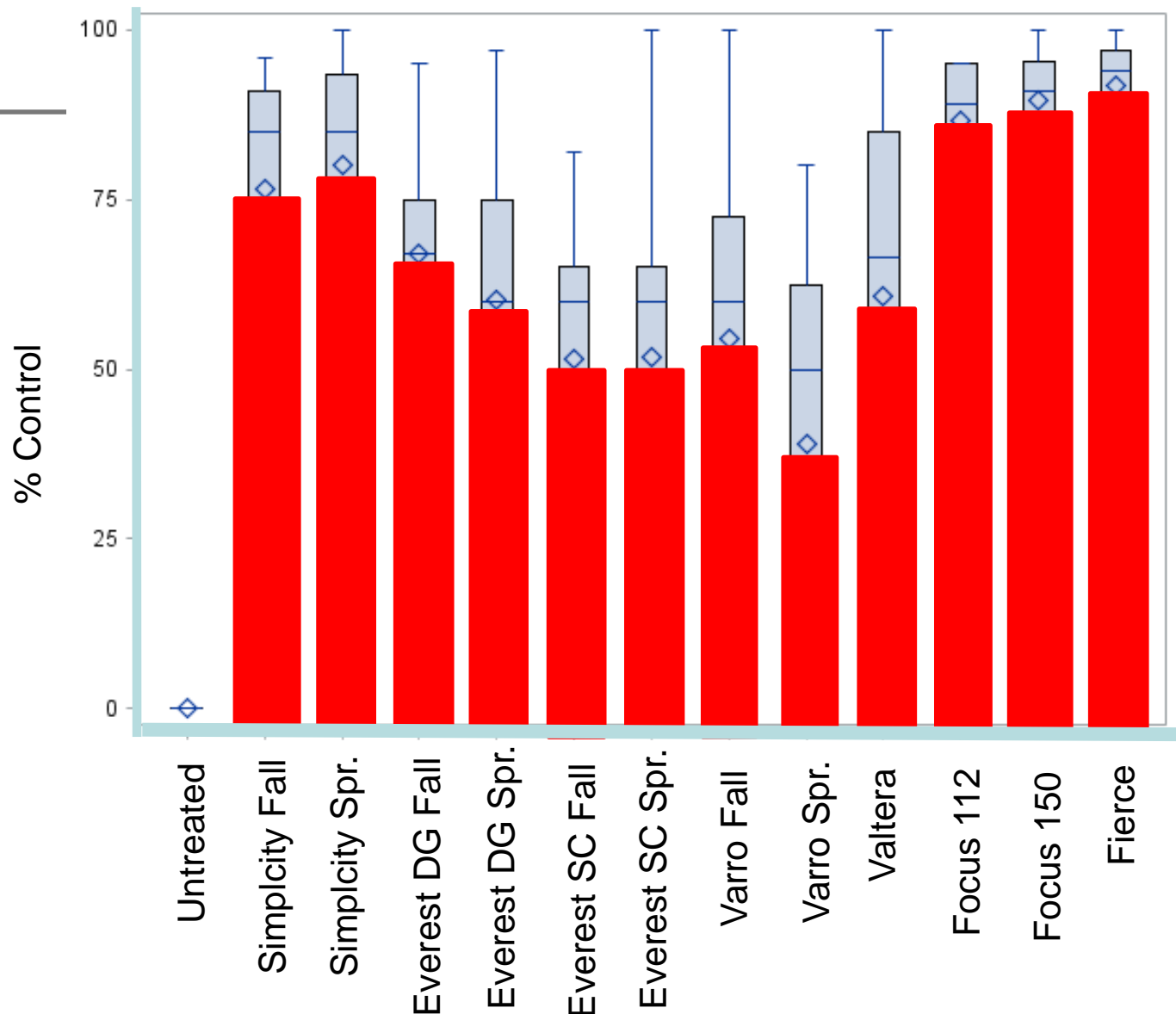
Pyroxasulfone – emerged grass weeds may have damaged root system



Japanese Brome Control – Studies in winter wheat: Coalhurst, Lethbridge, AB; Scott, SK. 2011-2013: 9 site-years.

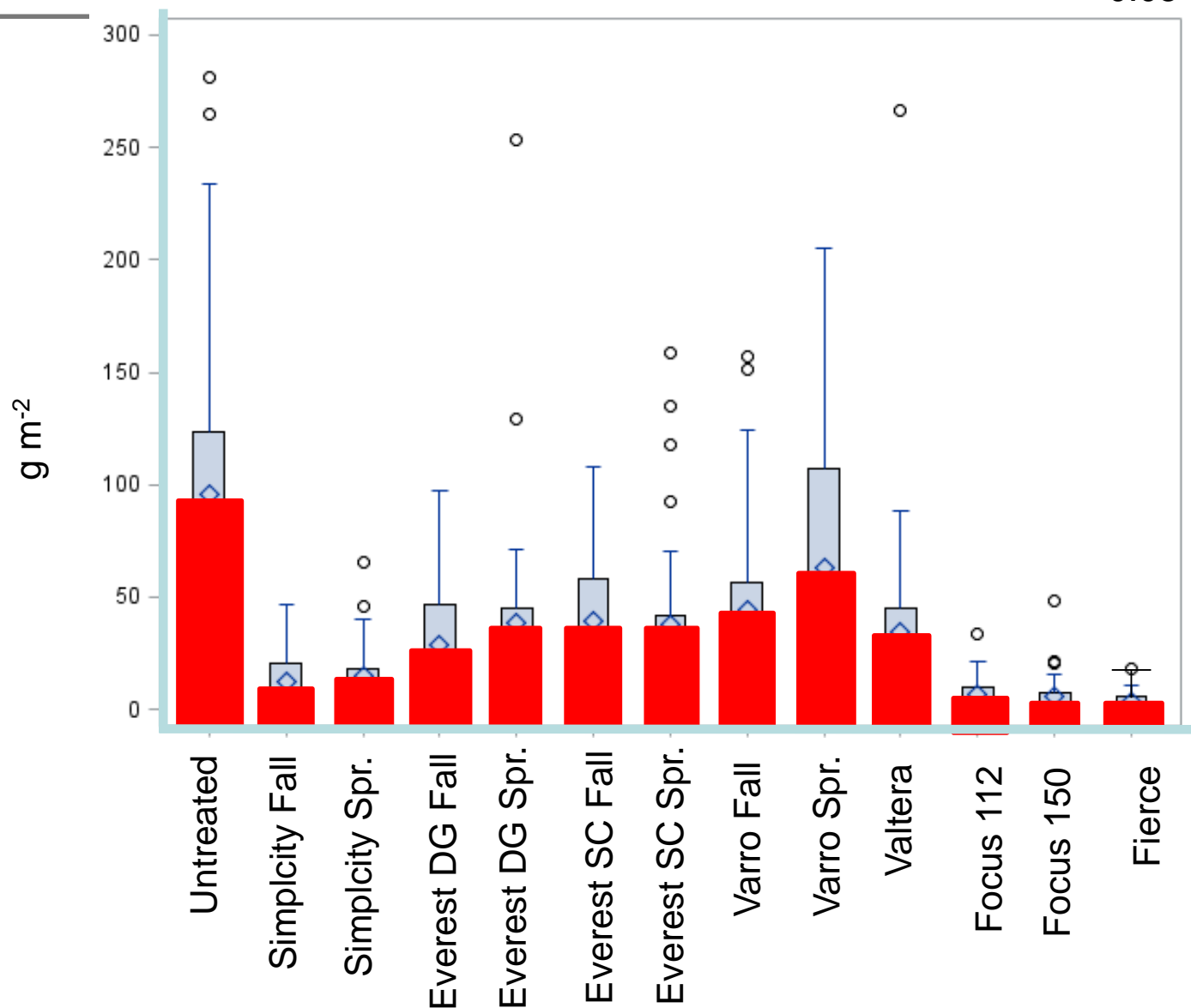


Downy Brome Control in Winter Wheat; 9 site-years



Downy Brome Biomass

Error bar = $LSD_{0.05}$



Focus

- Research underway on lentils
- Some growers experienced lentil injury in southern SK where they received excess spring rain.



QUESTIONS ??



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