

Herbicide Carryover: Developing Resistant Camelina

- *Brassica/Camelina* sensitivity to residual amounts of ALS-inhibitor (Group 2) herbicides is a major problem in adoption in PNW
- Many of these chemicals have very long residual activity in soil
- Good herbicides if not overused
- 300,000 acres of CF wheat (ORCF101, ORCF102, ORCF103) grown in Washington last year! Presumably sprayed with Beyond®

Group 2 herbicides

Imidazolinones

Beyond, Raptor, Pursuit...

Sulfonylureas

Glean, Finesse, Osprey, Olympus Flex, Ally, Accent, Amber, Mavrick, Harmony...

Resistance arises to these chemicals at a low frequency



Selection of a camelina mutant that is resistant to Pursuit

- 10 M seeds/acre rate
- Seed mutagenized (EMS)

Group 2 herbicide resistant oilseed varieties

Spring Canola: Winfield solutions/Complan Genetics, Mycogen, Pioneer, Dow UI (Clearwater; Gem rapeseed)
-be careful of SURT varieties SU tolerant but not IMI's

Brassica juncea canola: Croplan Genetics

Winter Canola: KSU (Sumner?)

Camelina: Work in progress

Camelina has lots of ALS genes- single mutants not completely resistant

Polymorphic bases in ALS gene family

SM4-1-GENO	TTGTAAGGTCCTGATTGCTCCTTGTCTCTCGAGACGTTAACTCAATAG
SM4-2-GENO	TTGTAAGGTCCTGATTGCTCCTTGTCTCTCGAGACGTTAACTCCGTAT
SM4-6-CDNA	TTGTAAGGTCCTGATTGCTCCTTGTCTCTTATTTTGCATTACCGTAT
SM4-4-GENO	TTGTAATGCTTGAATTTCTTCCTTCCTCTCGAGACGTTAACTCAATAG
SM4-1B-GENO	TAATTATGCTTGAATTTCTTCCTTCCTCTCGAGACGTTAACTCAATAG
SM4-8-CDNA	TAATTATGCTTGAATTTCTTCCTTCCTCTCGAGACGTTAACTCAATAG
SM4-4-CDNA	TAACTGGCTTTT TAGCGGACCACCGTCCCGTAAGTCATCGACTTGGTAT
SM4-1-CDNA	CAGTTGGCTTTT TAGTGGACCACCGTCCCGTAAGTCATTAACTTAATGT
SM4-5-CDNA	CAGTTGGCTTTT TAGTGGACCACCGTCCCGTAAGTCATTAACTCAA <u>C</u> AT
SM4-5B-CDNA	CAGTTGGCTTTT TAGCGGACCACCGTCCCGTAAGTCATTAACTCAATAT
SM4-7-CDNA	CAGTTGGCTTTT TAGTGGACCACCGTCCCGTAAGTCATTAACTCAATAT
SM4-3-CDNA	CAGTTGGCTTTT TAGTGGACCACCGTCTTTATTTTGTGATTACCGTGT

Mutation causing resistance

Tests following Beyond® applications are underway



Breeding plots Sprayed with ½ oz Beyond

Selection of elite lines with the SM4 gene are underway at WSU and private programs.