Winter Canola Variety Development

PNW Canola Workshop

January 25, 2024

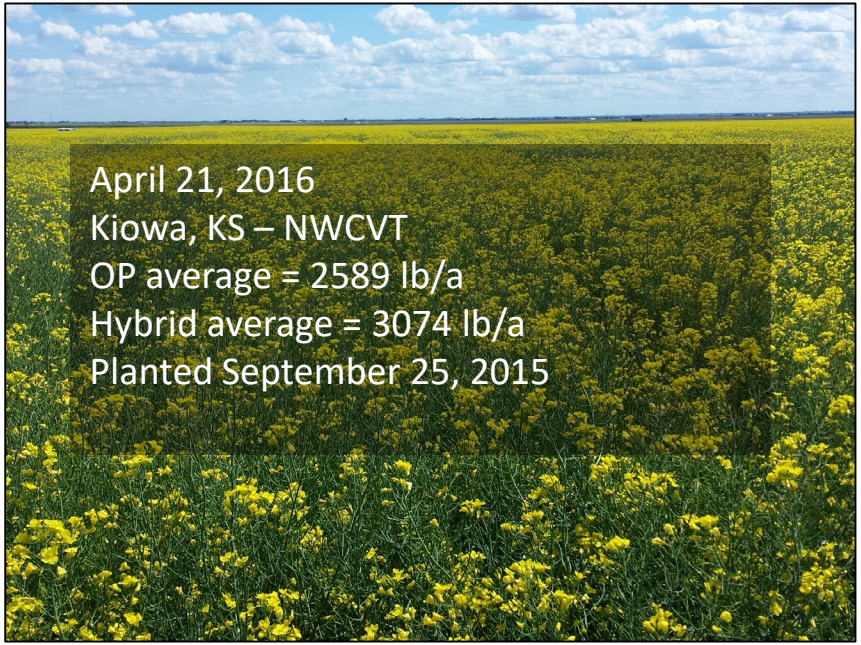
Mike Stamm – Kansas State University

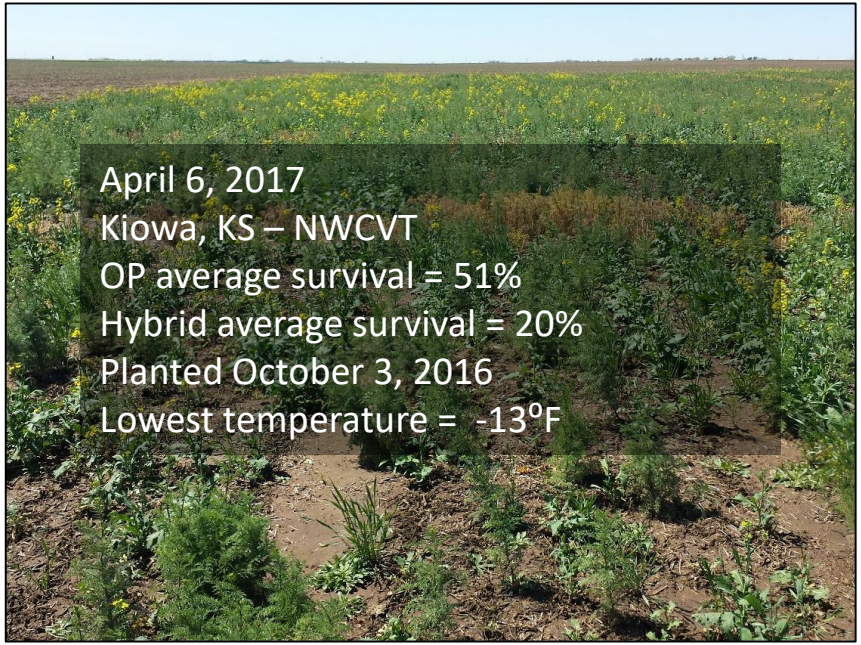
Hutchinson, KS
May 24, 2021

Winter Canola Variety Development

- Our main driver is making winter canola more consistent
- K-State is focused on hybrid parent lines, winter survival, lodging tolerance, blackleg resistance, Roundup Ready and conventional, and higher oil
- Active breeding and testing network
  - NWCVT
  - PNW WVT
- End market reinvestment in the Great Plains region should coincide with a transition from an OP-driven market to a hybrid market

Consistency Challenges on the Great Plains





There's a reason this land was all prairie.

12/15/2021

- High Wind Warning in effect from December 15, 09:00 AM CST until December 15, 09:00 PM CST
  Hazardous Weather Outlook
- Tornado Watch in effect from December 15, 01:20 PM CST until December 15, 08:00 PM CST
  Red Flag Warning in effect from December 15, 12:00 PM CST until December 15, 09:00 PM CST

En Español | Share

Current conditions at
Manhattan, Manhattan Municipal Airport (KMHK)
Lat: 39.14°N **Lon:** 96.68°W **Elev:** 1053ft.

Overcast
and Windy
74°F
23°C

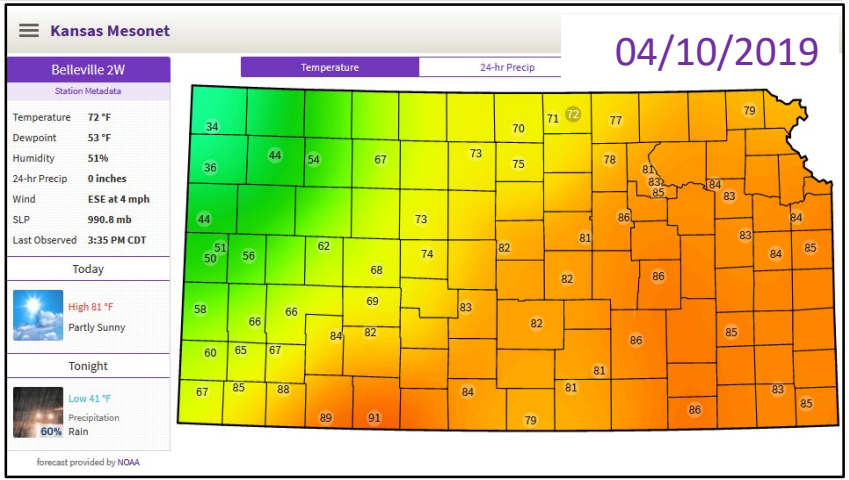
Humidity	60%
Wind Speed	S 33 G 59 mph
Barometer	29.47 in (997.2 mb)
Dewpoint	59°F (15°C)
Visibility	10.00 mi
Last update	15 Dec 12:52 pm CST

More Local Wx | 3 Day History | Hourly Forecast

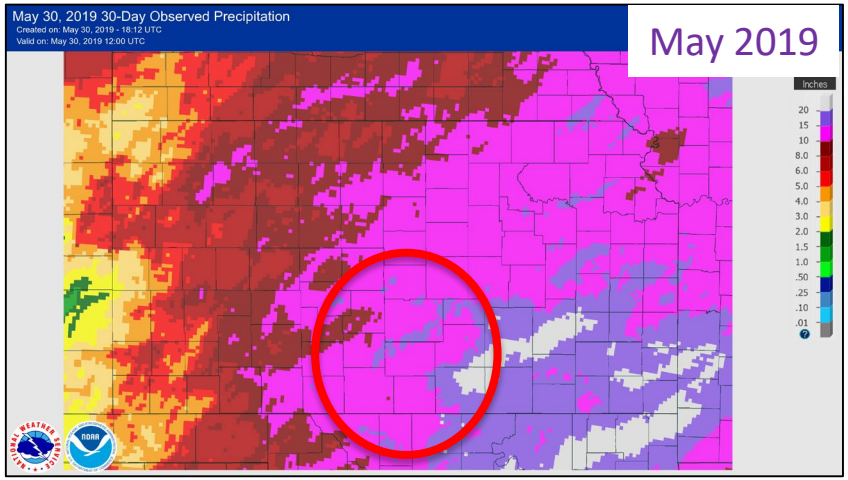
Extended Forecast for
2 Miles NE Manhattan Regional Airport KS

View in Desktop Mode

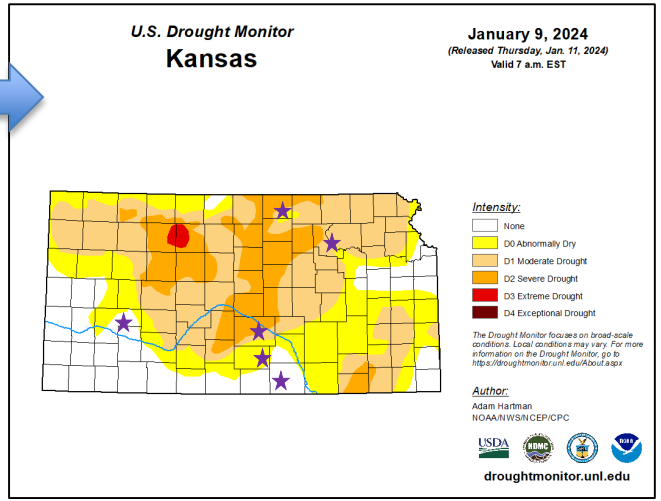
04/10/2019

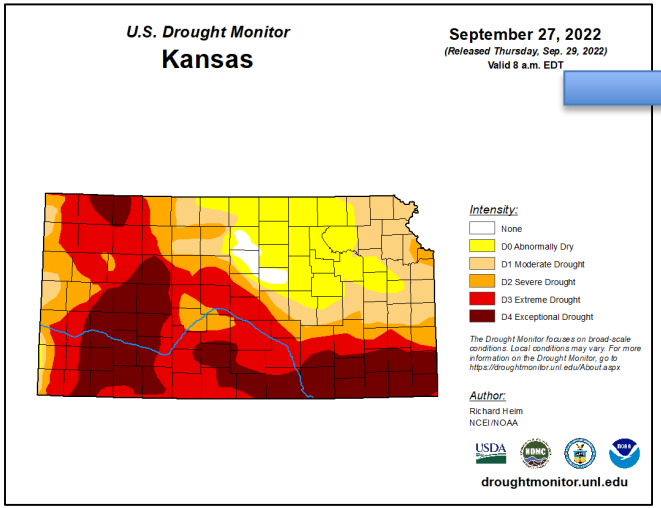


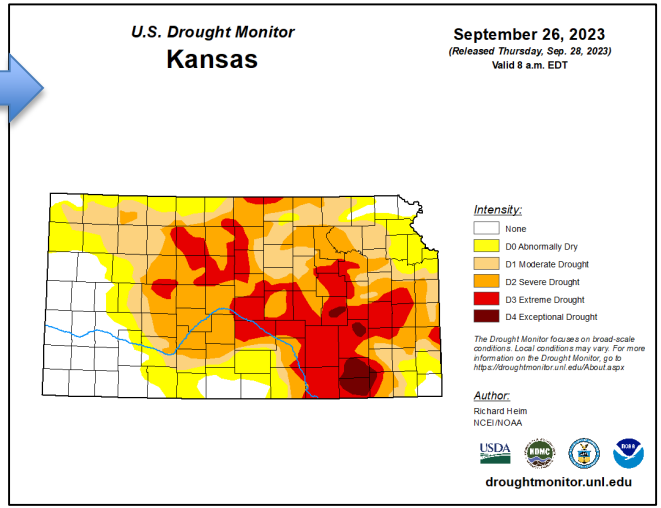
May 2019



KANSAS STATE UNIVERSITY







KANSAS STATE UNIVERSITY

Varieties released by the K-State canola breeding program and current licensees

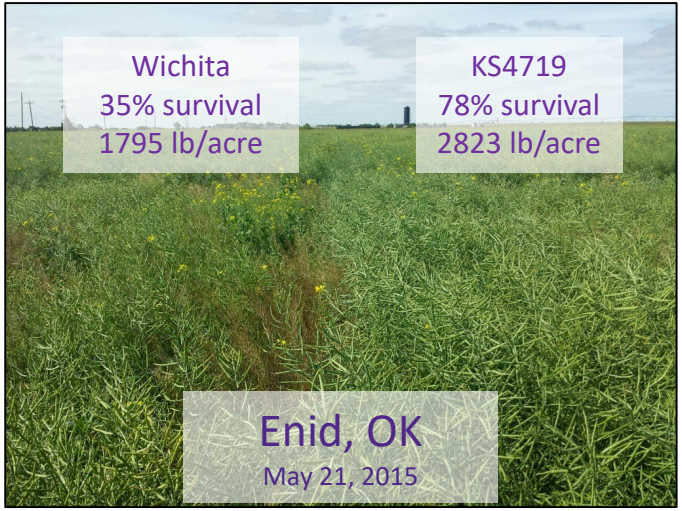
Variety	Licensee	Trait[1]	Release Year	First Yr. of Sales
CP225WRR	CROPLAN	RR/SURT	2014	2016
CP320WRR	CROPLAN	RR	2017	2018
CP1066WC	CROPLAN	Conventional	2020	2023
KSR4848	CROPLAN	RR	2022	?
Torrington	Ohlde Seed Farms	Conventional	2016	2018
Griffin	Spectrum Crop Dev.	DP	2011	2016
Surefire	Spectrum Crop Dev.	SURT	2017	2019
Star 930W	Star Specialty Seed	RR	2013	2019

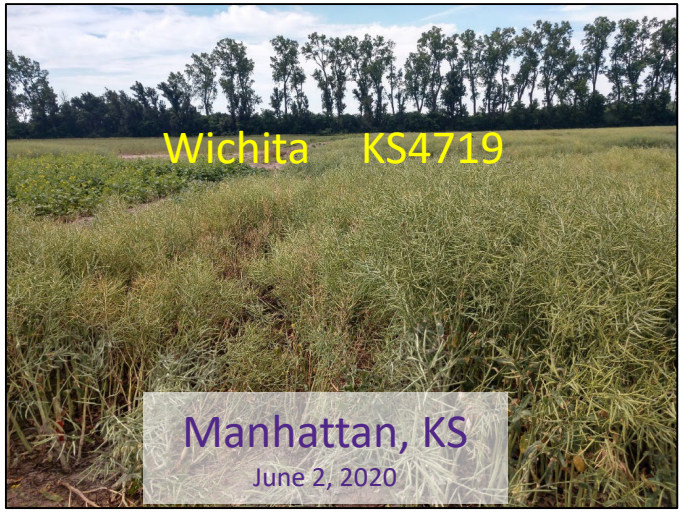
[1]RR = Roundup Ready; SURT = Sulfonylurea herbicide carryover tolerant; DP = dual purpose (forage/grain)

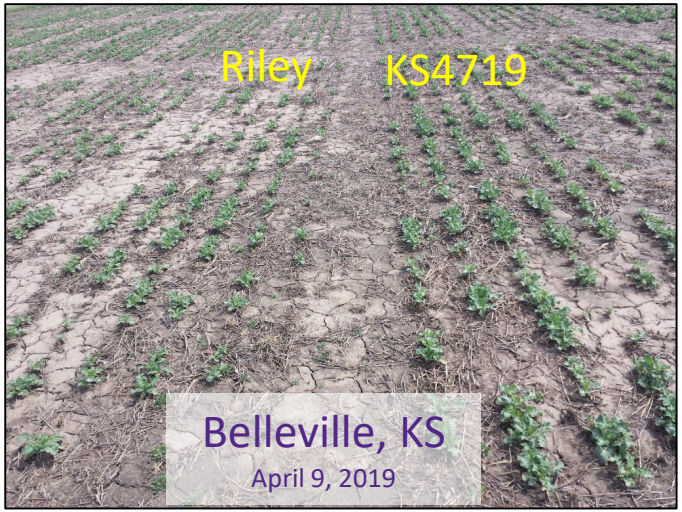
KANSAS STATE UNIVERSITY

KS4719
“CP1066WC”

- Improved lodging tolerance
- Reduced levels of crown/root rot
- Incrementally better winter hardiness than hardy check cultivars







KANSAS STATE UNIVERSITY

PNW WVT Summary (University of Idaho)

Name	Marketer/ Source	Trait	3-Yr Avg Yield	2023 Yield	2023 Winter survival
			-------lb/a (rank)------		1-9 (rank)
CP225WRR	CROPLAN	RR/SURT	3374 (10)	3579 (7)	5.7 (4)
CP320WRR	CROPLAN	RR	3520 (6)	3882 (2)	6.1 (3)
CP1066WC	CROPLAN		3496 (7)	3998 (1)	7.3 (1)
Surefire	Spectrum	SURT	3360 (11)	3327 (11)	4.7 (10)
KS4662	K-State			3727 (6)	6.5 (2)
KSR4854S	K-State	RR/SURT		3792 (4)	5.4 (5)
Mercedes	Rubisco		3999 (2)	3881 (3)	4.9 (8)
Amanda	UIdaho		3215 (15)	2961 (21)	4.1 (16)
LSD (0.05)				153	0.9

What is needed?

Bring all important traits into a hybrid background

- Ease of weed control resides with the RR OPs
- Winter hardiness resides with the conventional OPs
- Highest yield potential resides with the hybrids
- Hybrids generally have 1-3% higher oil than OPs
- Need for additional traits such as pod shatter, semi-dwarf plant stature, enhanced blackleg tolerance
- Key public and private partnerships
  - Bayer Crop Science – Conversion of hybrid parent lines to TruFlex™ with Roundup Ready® Technology
  - Private testing agreements and coordination of NWCVT
  - USDA-ARS – deacclimation “avoidance” in K-State germplasm


OP Trial
Mean = 23 bu/a
Lodging = 42%
Norwich, KS
NWCVT
5/28/2019
Hybrid Trial
Mean = 56 bu/a
Lodging = minimal
OPs
Hybrids

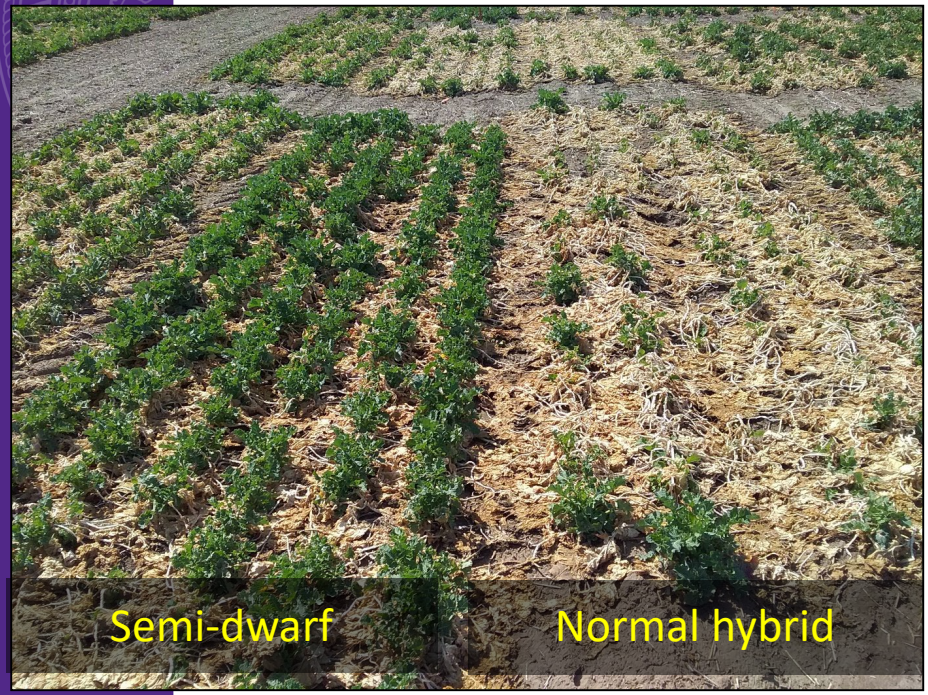
Hybrid Parent Line Development

- OGURA system licensed from INRA-France
- Cytoplasmic male sterility (cms) and restorer (Rf) genes developed from radish
- Widely used in spring and winter hybrid OSR
- Introgression of the TruFlex Roundup Ready trait

Hybrid Test Crosses

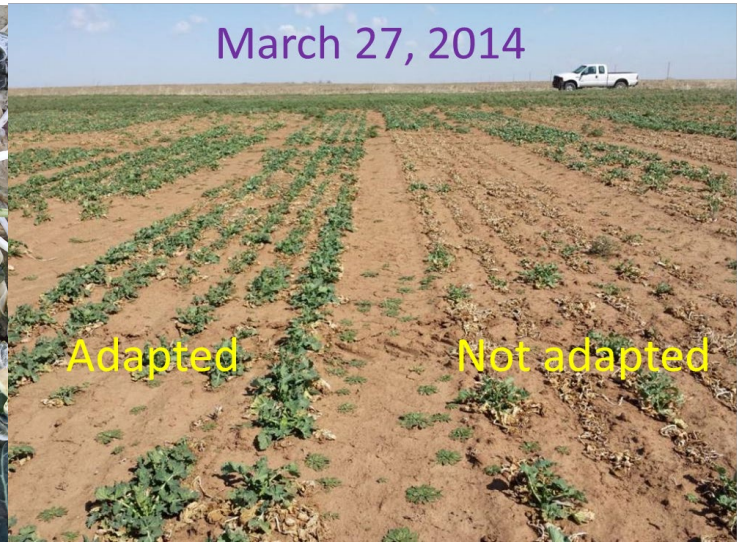
- KSU A-line by R-line tester
- Yield trial and combining ability studies, starting 2021

Manhattan, KS
Hybrid Trial - April 5, 2022



Winter Survival

- Continuous improvement
- Challenging trait to improve
  - Quantitative
  - No two years are alike
  - In field selection necessary
- Stand loss doesn't always equal yield loss



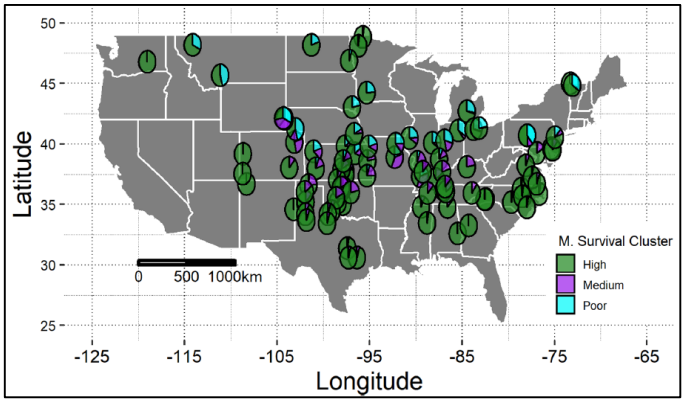
KANSAS STATE UNIVERSITY

Winter Survival – An Interaction of Genotype x Environment x Management

- Manage seeding rate
- Optimize planting date
- Residue management in row is non-negotiable in no till
- If using tillage, less is more
- Place the seed into moisture at 0.5” to 1.0”
- Don’t over apply N in the fall
- Three most important weather variables (*Secchi et al., 2020)*
  - Wind chill temperatures
  - Number of days between 5 and 14˚F
  - Number of temperature cycles above and below 32˚F
  - Over 30 weather variables studied
- 70% of variability in survival was due to environment, 3% genetic, and 7% interaction

Proportion of Cold Periods Classified as High, Medium, or Low Survival

- 190 site-years, 2003-2018
- Cold Period = first and last day mean daily temperatures is <32°F)
- *Secchi et al., 2020 - Winter survival response of canola to meteorological variables and adaptive areas for current canola germplasm in the United States. Agric. For. Met.*



KANSAS STATE UNIVERSITY

Questions?

Mike Stamm
Agronomist / Canola Breeder
Department of Agronomy
Kansas State University
785-532-3871
mjstamm@ksu.edu
Follow @ksucanola on X
Follow @KStateAgron on X