TEMPERATURE AND WATER STRESS IMPACTS CANOLA GRAIN COMPOSITION

A. HAMMAC, T. MAAZ, J. DAVIS, R. KOENIG, W. PAN

WOCS VARIETY TEAM: SOWERS, ESSER, STENBAKKEN, ROE,

COLLABORATING GROWERS

2016-17 CROPPING SYSTEMS PUBLICATIONS

Login Register

REVIEW ARTICLE

Front. Environ. Sci., 28 November 2017 | https://doi.org/10.3389/fenvs.2017.00076

Check for updates

Integrating Historic Agronomic and Policy Lessons with New Technologies to Drive Farmer Decisions for Farm and Climate: The Case of Inland Pacific Northwestern U.S.

William L. Pan[1*], William F. Schillinger[2], Frank L. Young[1], Elizabeth M. Kirby[3], Georgine G. Yorgey[3], Kristy A. Borrelli[4], Erin S. Brooks[5], Vicki A. McCracken[6], Tai M. Maaz[1], Stephen Machado[7], Isaac J. Madsen[1], Jodi L. Johnson-Maynard[5], Lauren E. Port[1], Kate Painter[8], David R. Huggins[9], Aaron D. Esser[10], Harold P. Collins[11], Claudio O. Stockle[12] and Sanford D. Eigenbrode[13]

Home / All Titles / Crop and Pasture Science / May 2016 / pg(s) 253-265

Crop and Pasture Science

Published by: CSIRO Publishing

« previous article : next article »

Select Language

translator disclaimer

Crop and Pasture Science 67(3-4):253-265. 2016

https://doi.org/10.1071/CP15217

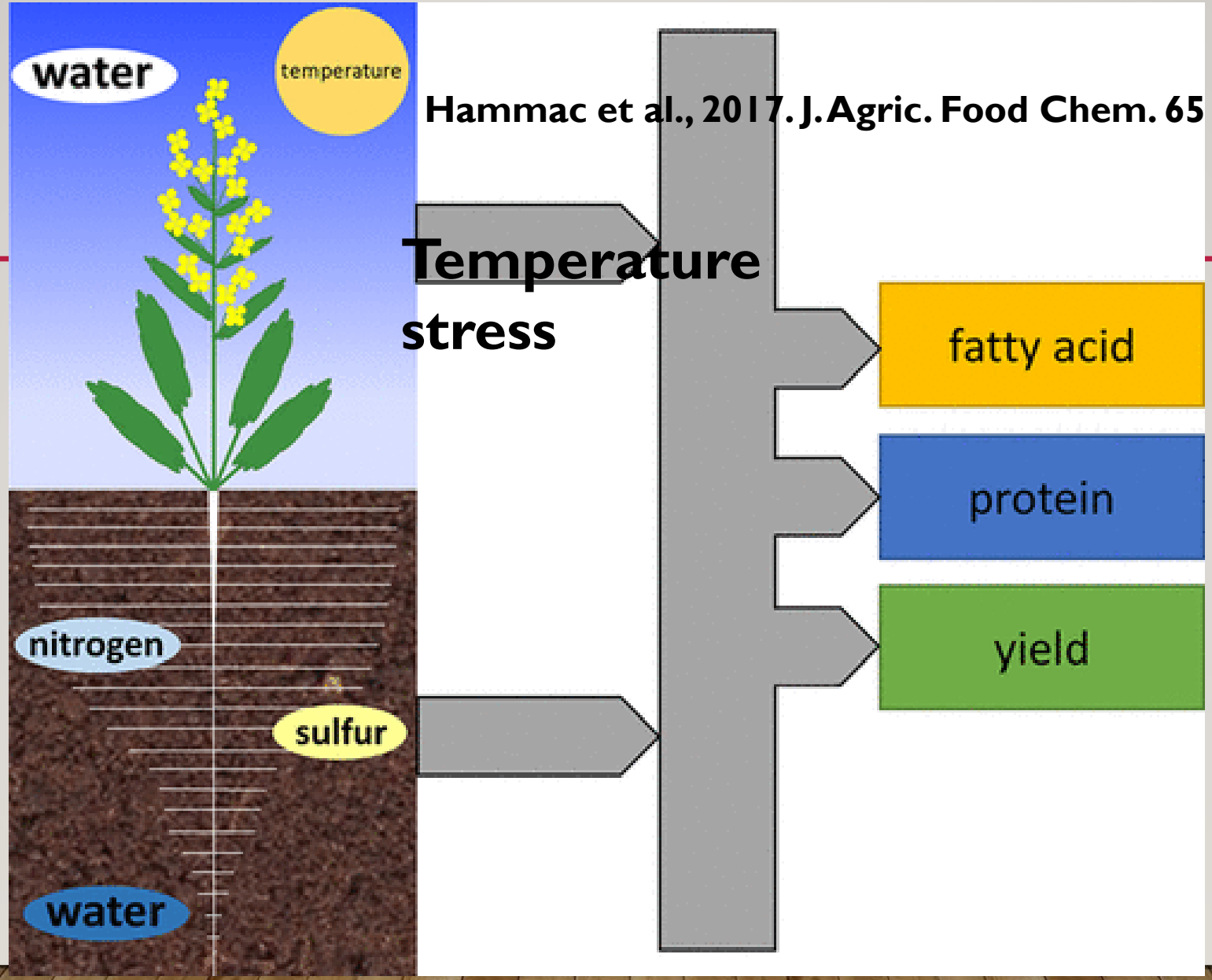
Canola integration into semi-arid wheat cropping systems of the inland Pacific Northwestern USA

W. L. Pan, F. L. Young, T. M. Maaz and D. R. Huggins

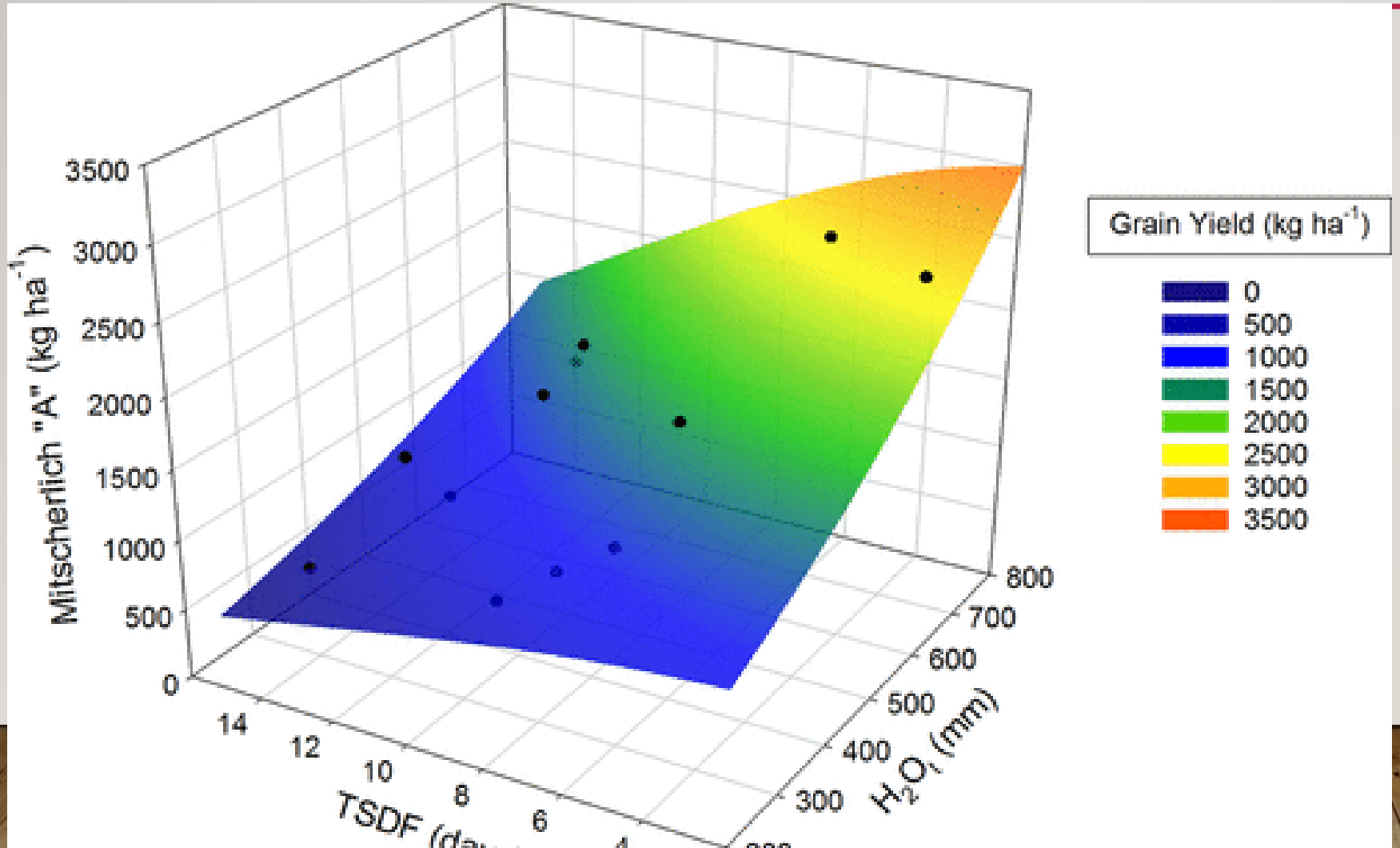
Advances in Dryland Farming in the Inland Pacific Northwest

Georgine Yorgey and Chad Kruger, editors

Hammac et al., 2017. J. Agric. Food Chem. 65 (48), pp 10429–10438

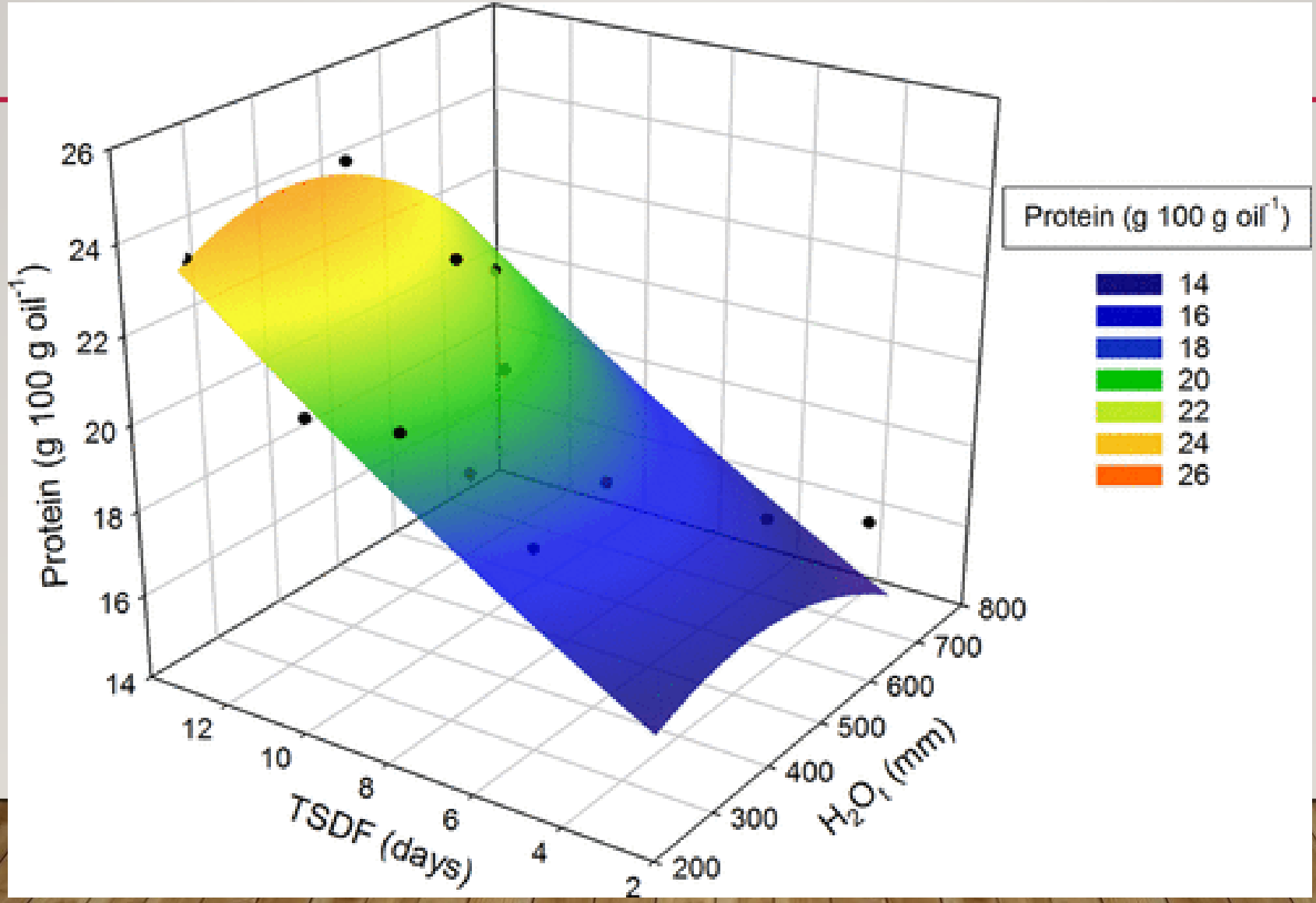


MAXIMUM SPRING CANOLA YIELD (“A) OVER 12 SITE-YEARS CORRELATED TO TEMPERATURE STRESSS DURING FLOWERING (>85F), AND AVAILABLE WATER

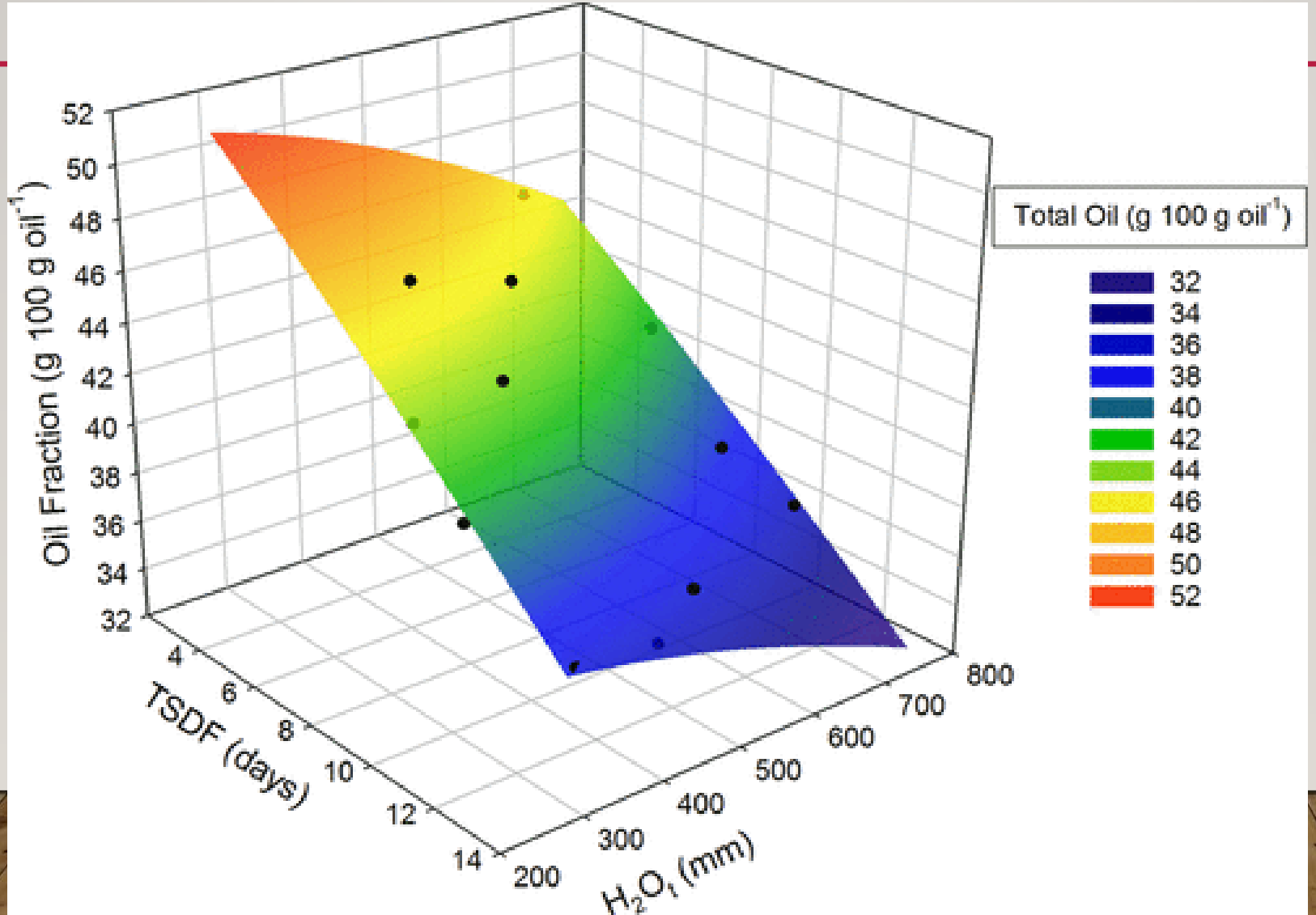


Hyola 357 and DKW55-55 at PCFS and Wilke, 2008-13

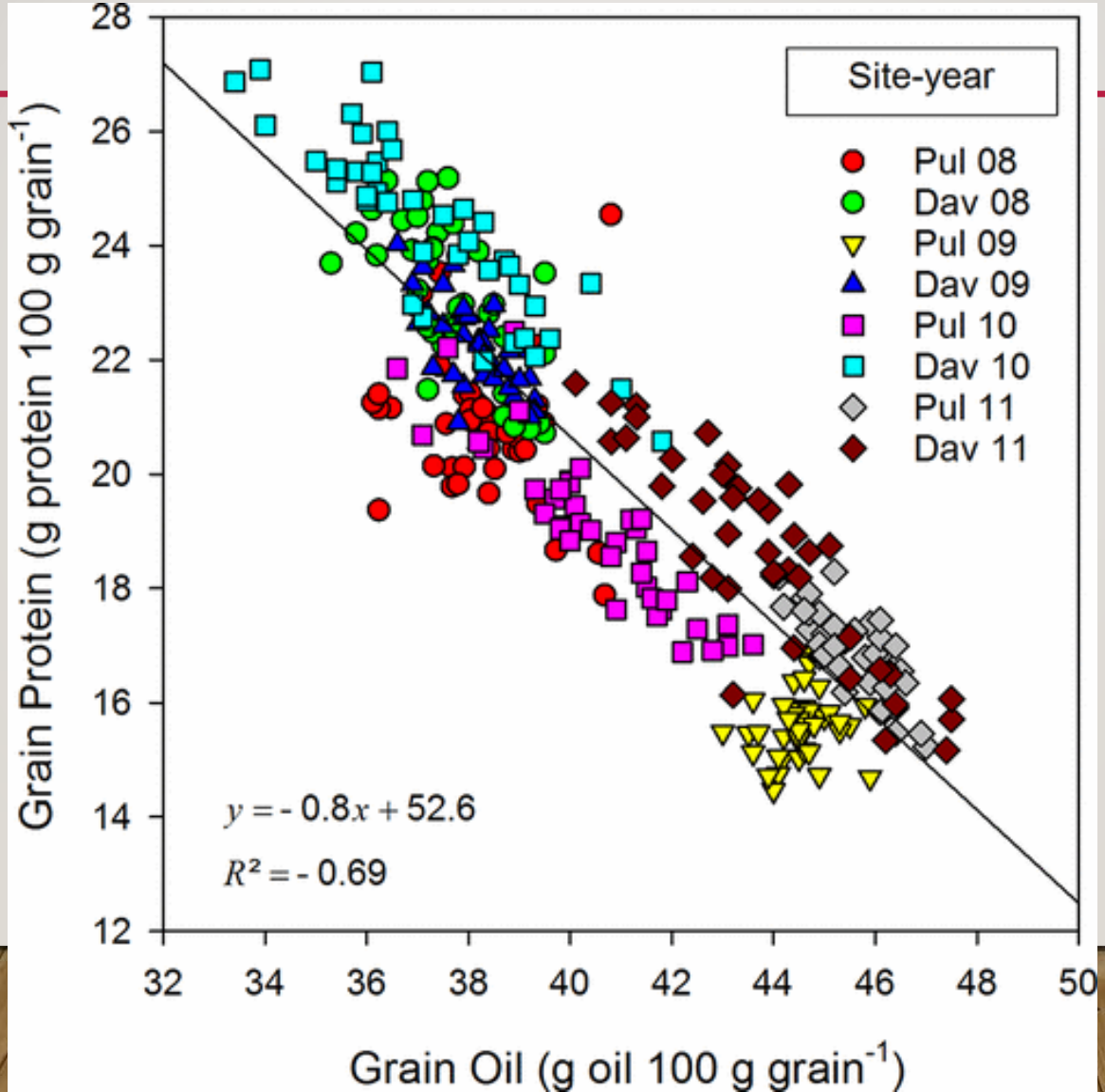
PROTEIN INCREASES WITH HIGH TEMPERATURE STRESS DURING FLOWERING, SIMILAR TO WHEAT



CONVERSELY, OIL DECREASES WITH INCREASED TEMPERATURE STRESS



INVERSE RELATIONSHIP BETWEEN PROTEIN AND OIL CONCENTRATIONS



RELATIVELY LITTLE IMPACT OF N AND S AVAILABILITY ON SPRING CANOLA GRAIN COMPOSITION

EXAMPLES OF SITE DIFFERENCES IN OIL FOR COMMON VARIETIES

Location	Variety	Total Oil Concentration	
Odessa	Claremore	34.4	A
Ralston	Claremore	41.0	B
St John	Claremore	41.9	B
Almira	Nexera 2024 CL	40.7	A
Walla Walla	Nexera 2024 CL	38.7	B
Pullman	Nexera 2024 CL	42.3	A

VARIETAL DIFFERENCES NOT SIGNIFICANT FOR SEVERAL FACTORS AND LOCATIONS. HIGH YIELDING ENVIRONMENTS FEATURE VARIETAL DIFFERENCES

Location	DM	Glucosinolates	OilPct	Protein	FA16	FA180	FA181	FA182	FA183	FA201
Almira	NS	NS	NS	0.0394	NS	NS	0.0411	0.063	0.0114	0.0399
Odessa	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pullman	0.0069	0.0035	0.0113	0.0062	0.0033	0.0014	<.0001	0.0002	0.0001	NS
Ralston	0.0252	<.0001	NS	NS	<.0001	<.0001	<.0001	0.0001	<.0001	0.0429
St John	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Walla Walla	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Number is value of *P* Red for less than 0,01, otherwise green for less than 0.05, otherwise blue for less than 0.1

SUMMARY

- Oil concentration reduced by high temperature stress, explaining the early plant recommendation for spring canola.
- Fertility effects on grain composition were relatively minor
- Varietal differences in grain composition are best expressed under ideal environmental and management conditions.
- QUESTIONS?