# Canola, a viable crop for California

Nicholas George, Joy Hollingsworth, Lucy Levers, Sally Thompson & Stephen Kaffka - The University of California, Davis.

## CALIFORNIA NEEDS WINTER CROPS

### Why canola in California?

**Canola has excellent potential as a crop to diversify Californian agricultural systems.**

California has the most diverse and valuable agricultural sector in the US, but annual cropping systems are dominated by warm-season species and economically viable cool-season crops are limited. The most common annual cool-season crops are cereals. The economic viability and sustainability of the Californian agricultural sector would be improved by more winter-crops, especially given climate change predictions. There is no commercial canola production in California at the present time.

**We are comprehensively evaluating the potential of canola as a crop for California.**

The ideal canola varieties for Californian agro-ecosystems, and their yield potential, and critical agronomic limitations to canola production, were previously unknown. We therefore established a project to conduct multi-environment trials & agronomic studies to facilitate the establishment of a canola industry in the state. This research project is still ongoing. In this poster we provide a summary of current research findings.

### Research questions:

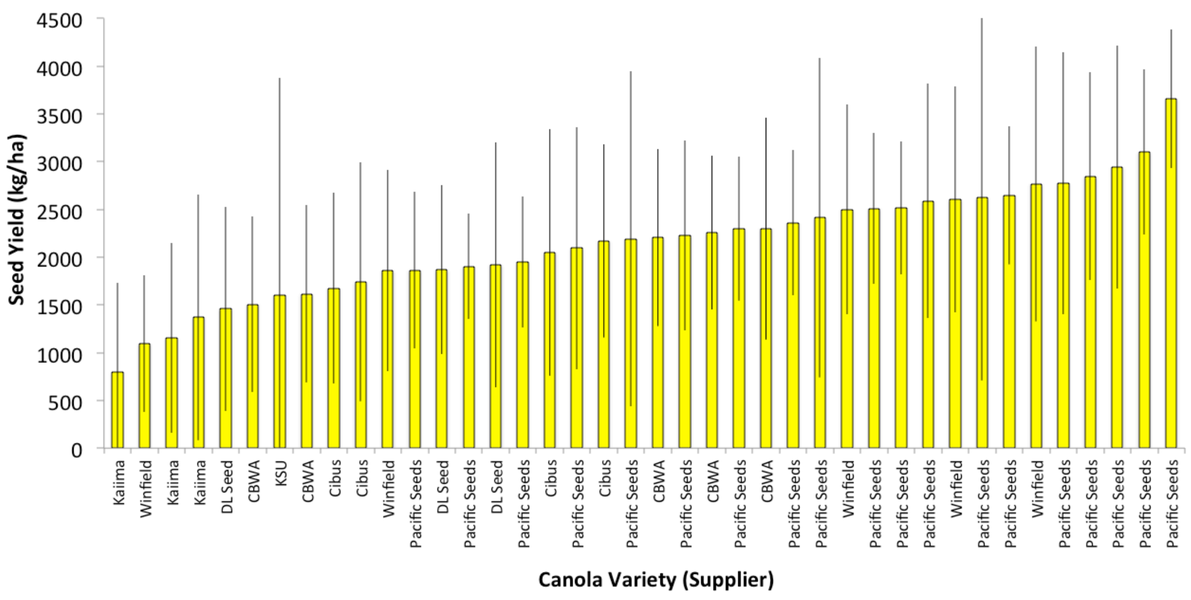
1. What are the best-adapted varieties by region?
2. What is their yield potential?
3. What are critical agronomic practices?
4. What is the likely water use?
5. Is the APSIM crop model reliable for CA canola?

## MULTI-ENVIRONMENT TRIALS

**A range of canola varieties are being evaluated at multiple locations.**


Multi-environment trial sites.

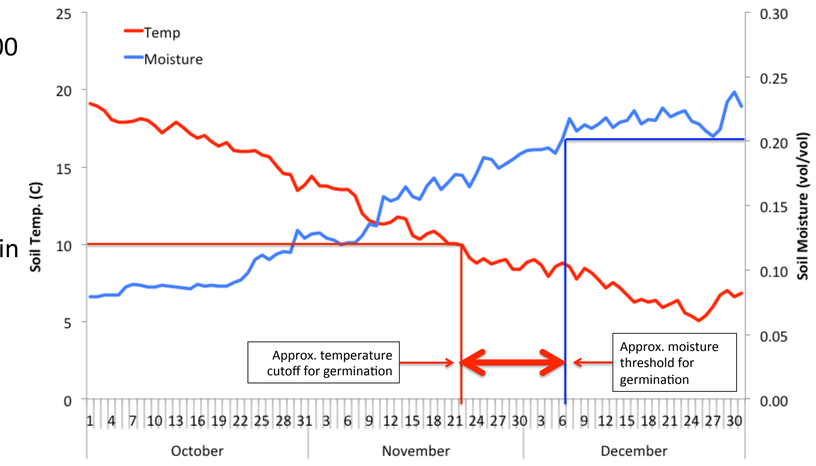
- Over 90 canola varieties from 14 public & private breeding programs.
- Spatially optimized partially-replicated trial design analyzed using mixed models.
- Winter types generally produce no seed.
- Spring types yield between 1 & 4 T/ha.
- Early maturing types from Australia consistently achieve the highest yields.
- Seed oil content averages 46 %.



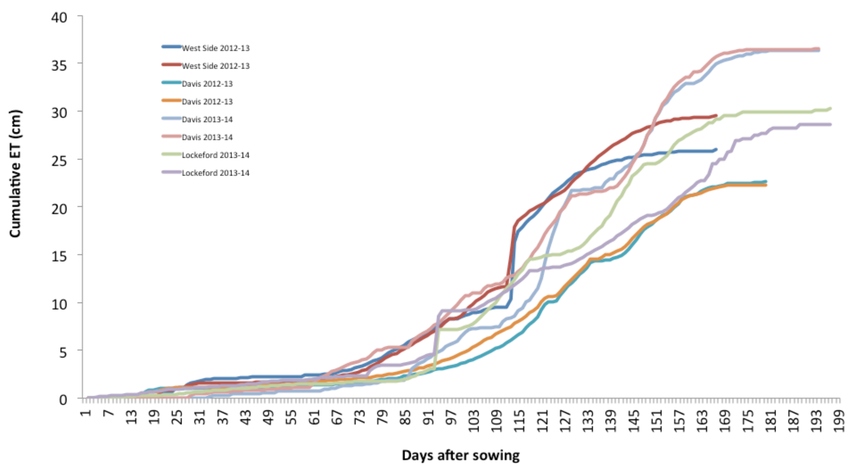

The mean yield for canola at different sites in California (mixed model best linear unbiased predictor). Varieties not identified for legal reasons.

## AGRONOMIC RESEARCH

- Total winter rainfall in the Sacramento Valley (400 to 500 mm) should be sufficient for high yields.
- Trial results and long-term weather data suggest a mismatch between winter rain & soil temperatures.
- Successful canola production may require early planting (October) combined with supplemental irrigation.



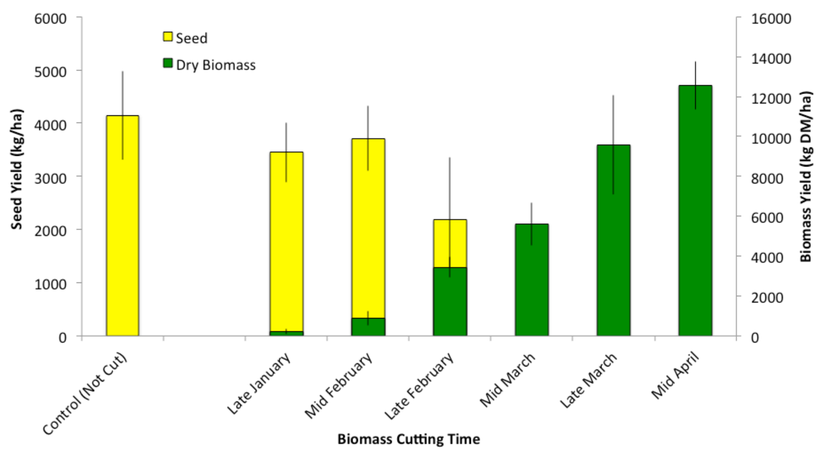

Estimated soil moisture and temperature for Davis, CA.




Estimated evapotranspiration from canola at multiple sites in California.

- Preliminary analyses of data from soil moisture sensors suggest canola in California is using less water than winter wheat (~60 cm).

- Canola could be used as a dual-purpose crop in ranching systems.
- A dual-purpose study found no significant reduction in seed yield compared to controls following biomass harvests in late January and mid February.




Seed and biomass yields from plots of canola cut at different times throughout the growing season.

## CONCLUSIONS

Our research suggests suitably adapted canola varieties, notably those developed for southern Australia, may be economically viable in cereal-growing systems of California. Irrigation demand should be similar to, or lower than, existing cereal production.

We recommend continued in-field evaluation of canola to further refine our knowledge regarding crop adaptation in the diverse agro-ecosystems of the state.


## Acknowledgements

Vincent Bikoba - project technician

Brad Hansen – UC Davis, Dept. of Plant Sciences
Daniel Marcum – UC Cooperative Extension, Shasta County
Josh Davy - UC Cooperative Extension, Tehama County
Mark Lundy – UC Cooperative Extension, Colusa County
Oli Bachie - UC Cooperative Extension, Imperial County
Royce Larsen – UC Cooperative Extension, San Luis Obispo County
Steve Orloff – UC Cooperative Extension, Siskiyou County
Steve Wright – UC Cooperative Extension, Tulare & Kings Counties
Vonny Barlow – UC Cooperative Extension, Palo Verde Valley

*Field Stations & Farms:*

UC Davis Research Farm
ANR Desert Research & Extension Center
ANR Intermountain Research & Extension Center
ANR Kearney Agricultural Research & Extension Center
ANR West Side Research & Extension Center
USDA Lockeford Plant Materials Center

Jerry Maltby, Craig Rossier, and the Sinton, Borror & Pedotti families.

*Seed suppliers*

Canola Breeders Western Australia
Cibus
DL Seeds
Kaiima
Pacific Seeds
WinField
Kansas State University.


[1] Department of Plant Sciences, One Shields Avenue, University of California, Davis, CA 95616-8770. *Corresponding author: NicGeorge@ucdavis.edu. Our research is funded by the University of California Division of Agriculture and Natural Resources.

UCDAVIS
DEPARTMENT OF PLANT SCIENCES
College of Agricultural and Environmental Sciences