Pecan Oil Nutritional Potency

Native versus Improved

Does Location Matter?

Does Year Matter?

Pecan Oil Nutritional Compounds

- Oil is 65 to 70% of pecan kernel's weight
- Fatty acids
  - 55 to 70 % oleic acid - Heart healthy, stable to oxidation
- Gamma Tocopherol
  - 80 to 170 μg per gm pecan - Antioxidant and activity against diabetes
- Beta Sitosterol
  - 800 to 1,000 μg per gm pecan - competes with cholesterol absorption, may enhance insulin production
- Squalene
  - 70 to >200 μg per gm pecan – helps skin repair UV damage

Diabetes

- World prevalence in 2000 was estimated at 2.8 % (171 million people)
  - By 2030 an increase to 4.4 % is expected (366 million people)
  - USA prevalence rose from 4.5 % in 1995 to 8.2 % in 2010, but…
- Oklahoma ranks highest in diabetes prevalence, increasing by 227 % from 1995 to 2010 (CDC)
- USA annual cost for diabetes treatment in 2012 was $245 billion

Pecans and Diabetes

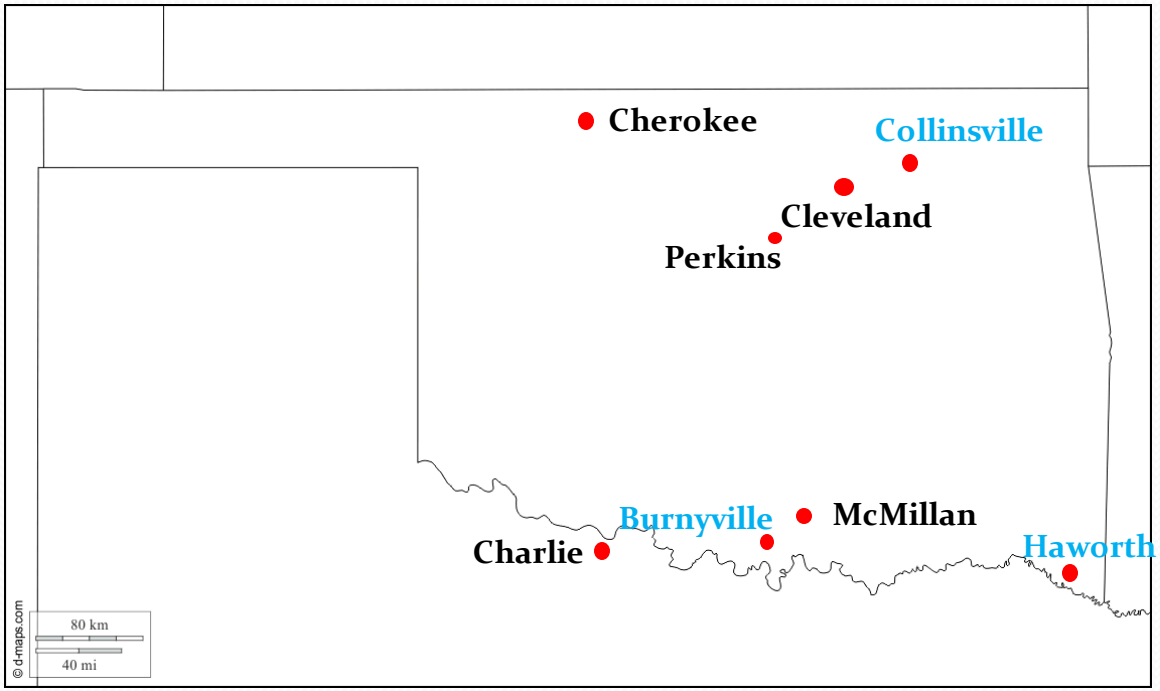
- γ-Tocopherol quenches reactive nitrogen (NO) which explode during inflammation especially in diabetics
- β-sitosterol increases insulin level & is an antioxidant
- Can the combined effects decrease diabetes disease progression?

Pecans and Sunburn

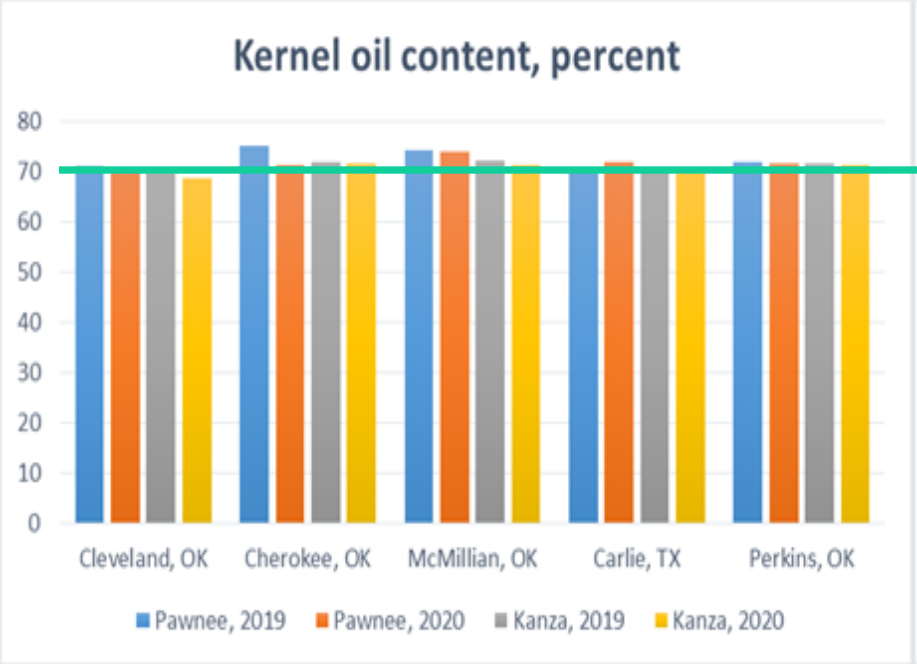
- Squalene - protection against damage caused by UV irradiation (Oshawa *et al*., 1984; Auffrey, 2007; Kostyuk, *et al*., 2012)
- Conventional source is extracted from shark liver
- Depletion in shark populations, is pecan a viable alternative?

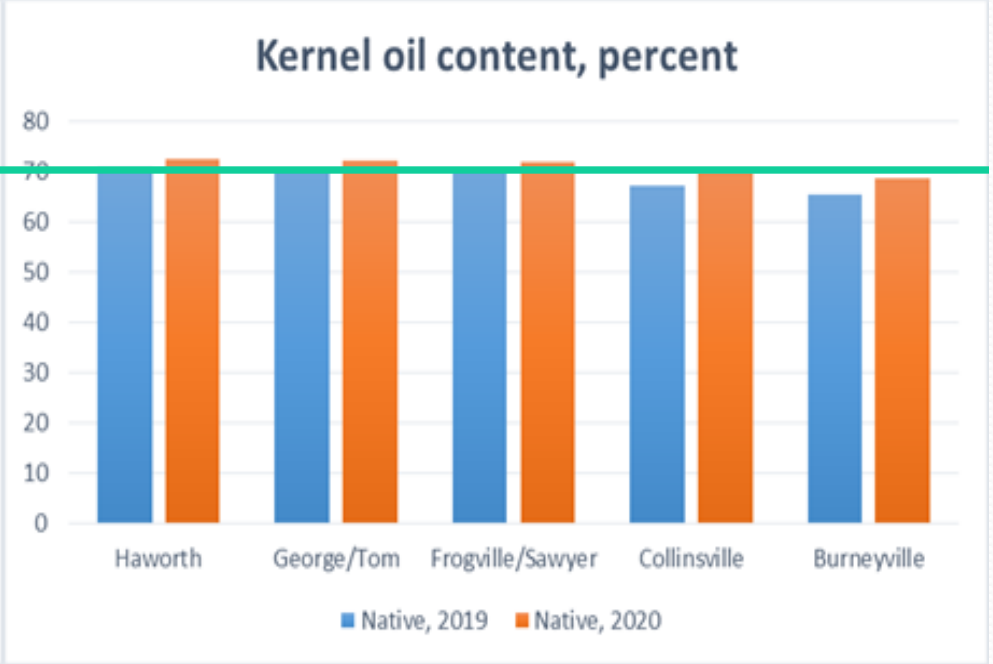
Our Study

- Improved variety (black letters; ‘Pawnee’ and ‘Kanza’) versus native populations (blue letters)
- Differing locations in Oklahoma
- Two years
  - 2019 (“on” year)
  - 2020 (“off” year)



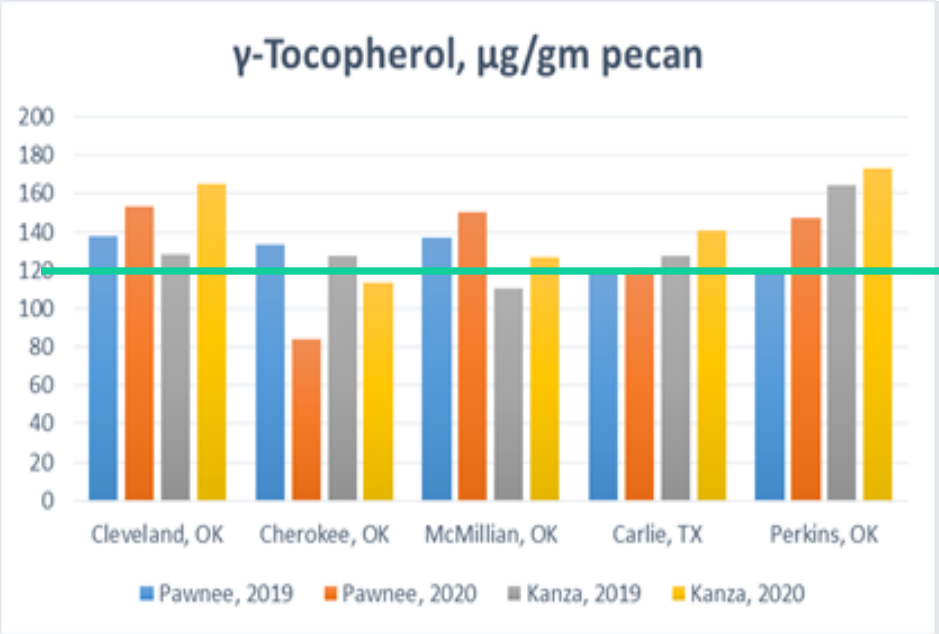
Pecan Kernel Oil Content

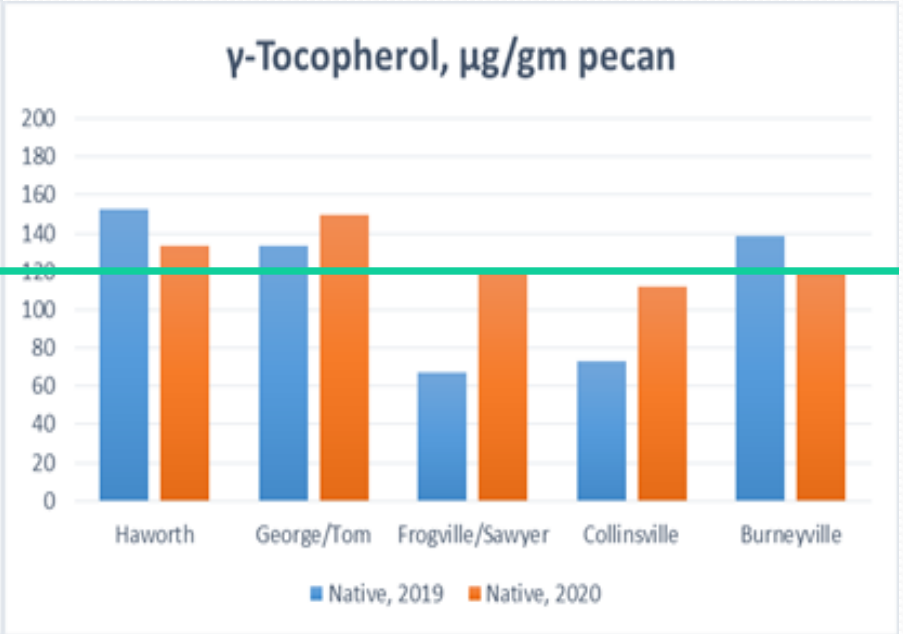




No real difference between varieties and no real difference between improved varieties and natives, regardless of location.

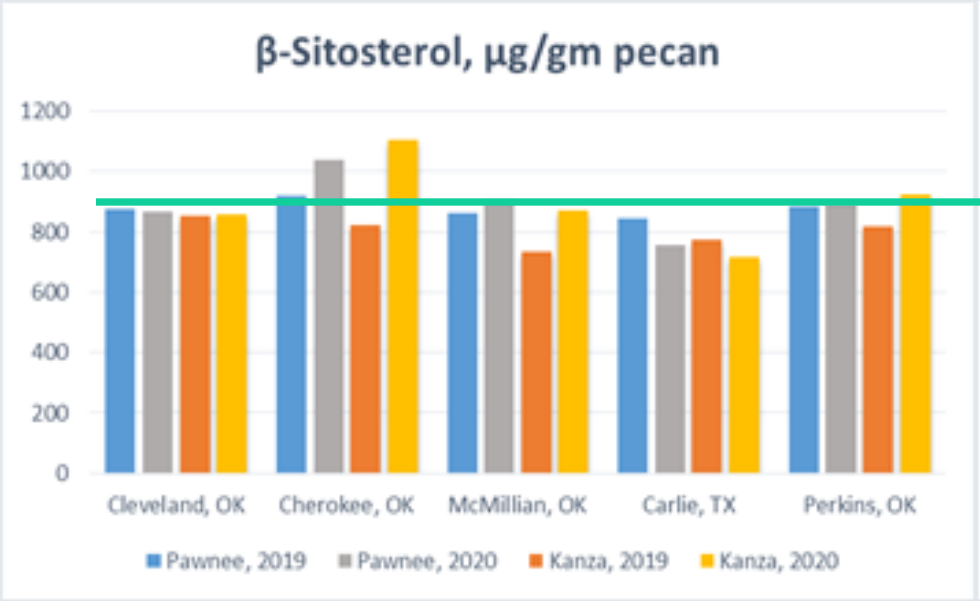
Pecan Gamma-Tocopherol

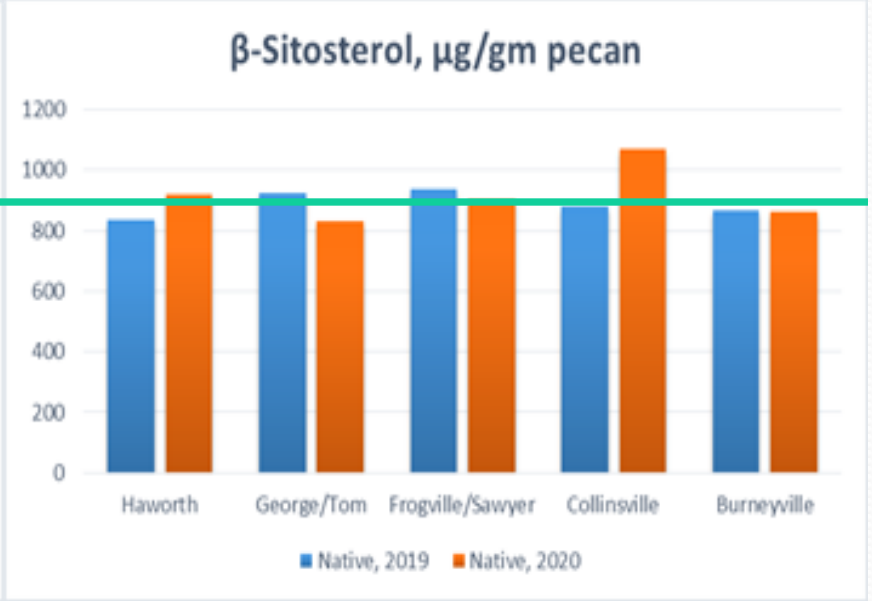




No consistent yearly trend; no consistent difference between varieties and no real difference between improved varieties and natives (Sawyer and Collinsville may have been lower in 2019).

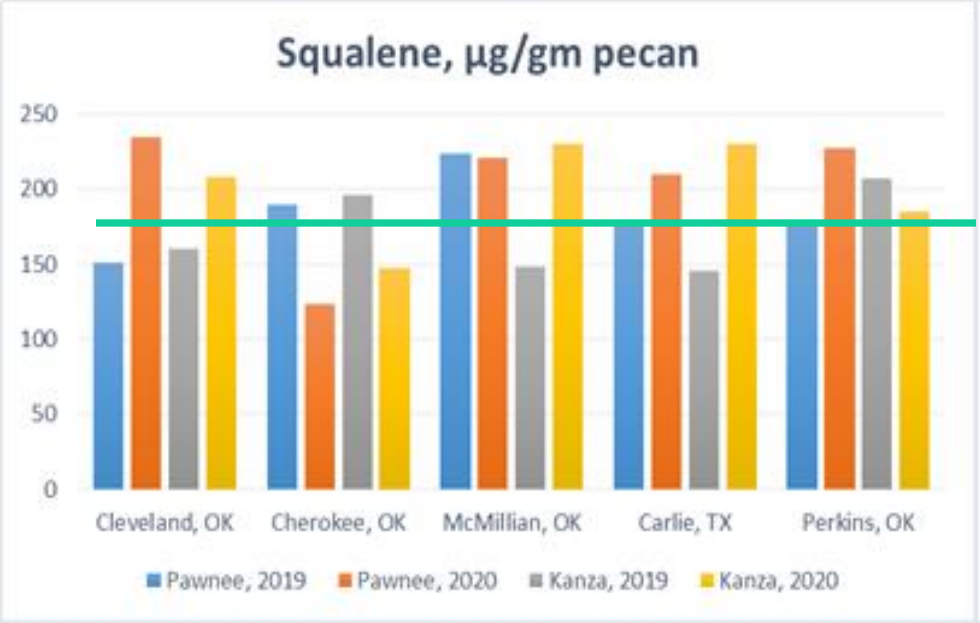
Pecan Beta-Sitosterol

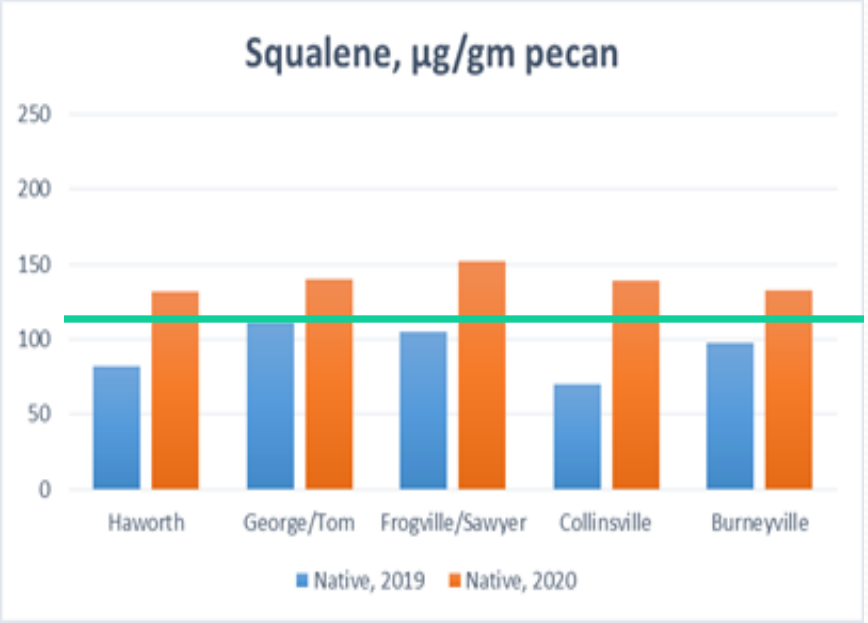




No consistent yearly trend; no consistent difference between varieties and no real difference between improved varieties and natives

Pecan Squalene



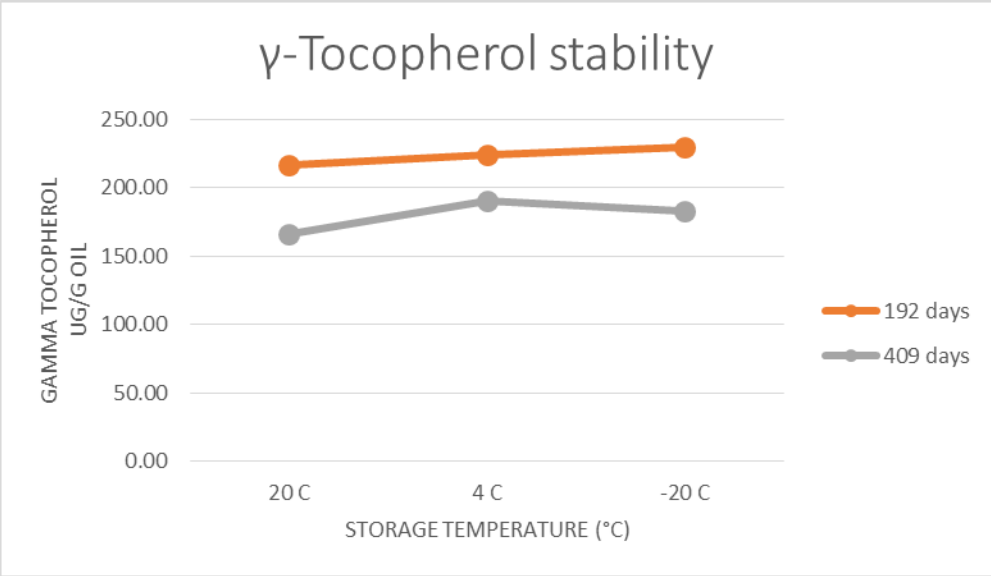


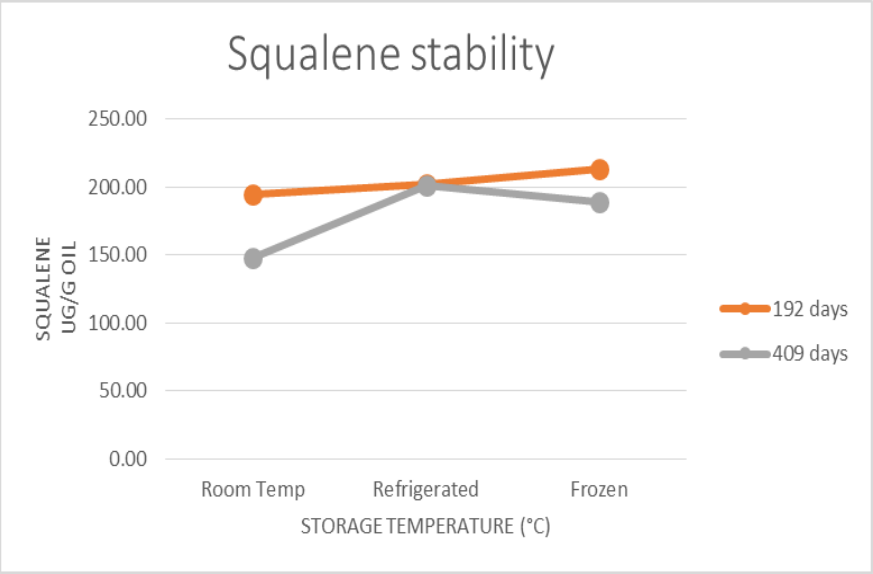
No consistent yearly trend for improved types but lower amounts during the 2019 “on” year compared to the 2020 “off” year in native types; Improved types may have been richer sources of squalene than native types.

Does Nutritional Potency Differ for Oklahoma Pecans?

- For the most part, no.
  - Oil content is the same (shell-out percent is greater for improved variety versus native pecans).
  - Gamma-tocopherol was mostly the same between improved variety and native pecans - lower amounts were possible for natives at two locations in 2019.
  - Beta-sitosterol was almost as stable as oil content – no difference.
- In the case of squalene, probably.
  - Improved varieties were mostly higher than native pecans.
- Year matters for gamma-tocopherol and squalene, but consistent trends aren't there.

Maintaining Pecan Oil Nutritional Potency





- Gamma-tocopherol and squalene seemed stable to storage at refrigerated or frozen temperatures after 6 months.
- Gamma-tocopherol degraded at all temperatures and squalene degraded at room temperature only after 13 months.
- To maintain nutritional potency, store pecan oil cold for less than 1 year.

Pecan Oil Nutritional Potency

Native versus Improved

Does Location Matter?

Does Year Matter?