



Cuphea: A Potential New Crop Source for Bioenergy & Bioproducts

Russ Gesch

USDA-ARS
North Central Soil Conservation
Research Lab, Morris, MN



Cuphea grown 14 miles NE of Morris, MN
during 2005





Why consider new/alternative crops for bioenergy & biobased products?

- ❑ Some may be better suited for energy use and petroleum replacements than conventional crops
- ❑ Need to diversify agricultural systems
 - ❑ Minimize pest & disease problems
 - ❑ Improve soil and water quality



New Crops

- ❑ Success is dependent on
 - ❑ Favorable agronomics
 - ❑ Raw materials produced must, or should be novel (little or no domestic source)

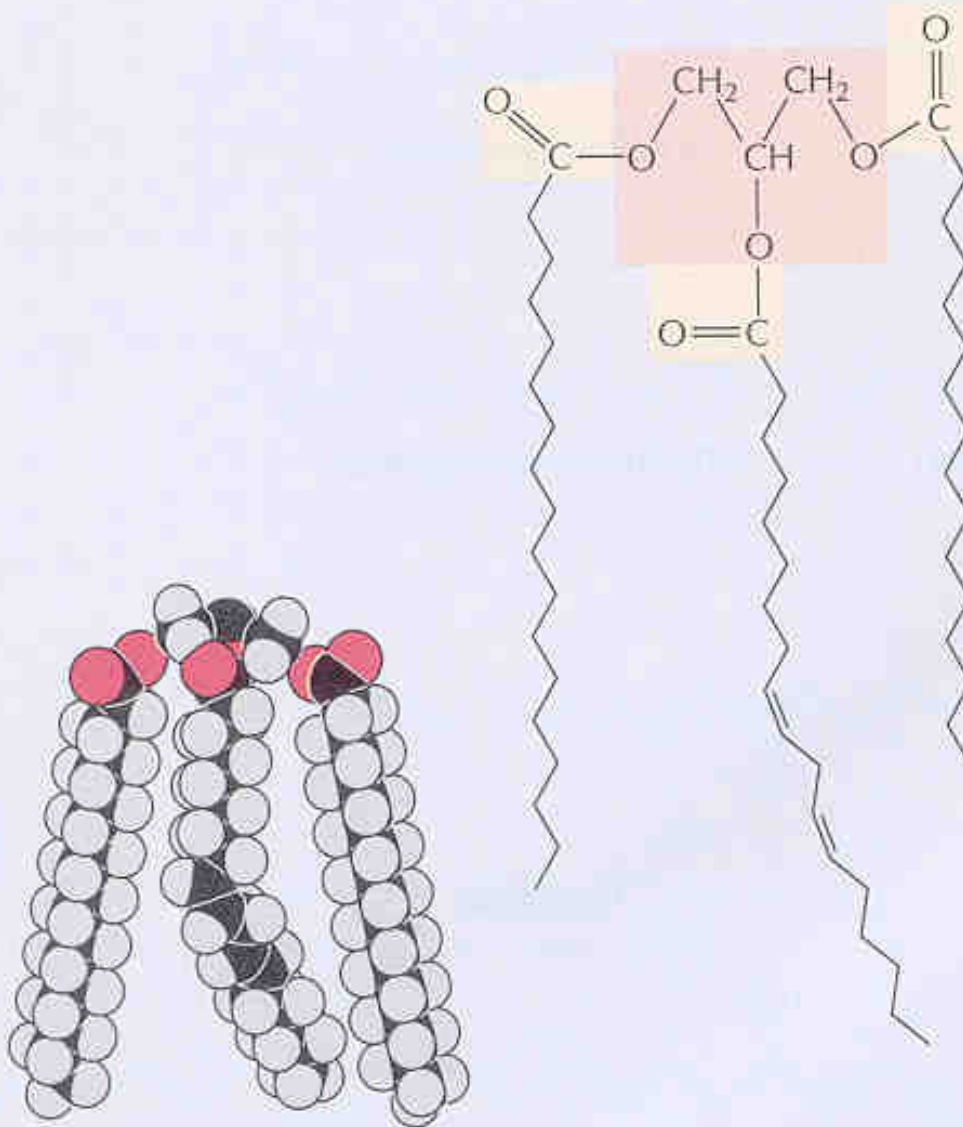


A vertical strip on the left side of the slide shows a Cuphea plant with green leaves and small purple flowers. At the top left, there is a small inset image showing a close-up of a single purple flower.

Properties of cuphea oil

- ❑ Uniquely different than conventional oilseed crops
- ❑ Its seed oil is a rich source of small- and medium-chain fatty acids (C:8 to C:14)
- ❑ Similar to tropical plant oils

(B) Triacylglycerol



Biochemistry & Molecular
Biology of Plants, 2000;
eds. Buchanan, Gruissem, &
Jones.



Products made from MCFAs



- ❑ US imports ~5.5 billion lbs. of oil annually to manufacture such products
- ❑ A near equal amount of petroleum is also used

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Potential as a liquid fuel

- ❑ Low MW of oil
 - ❑ No chemical modification (methyl esters)
- ❑ Cuphea oil high in C:8 & C:10 has fuel properties similar to #2 diesel
- ❑ We now have enough cuphea oil for extensive testing



Vegetable Oil Estolides

- ❑ Products
 - ❑ Motor oil
 - ❑ Hydraulic fluid
 - ❑ Lubricants
- ❑ Process is relatively simple and low cost (.23 ¢/lb)
- ❑ Exceptional cold temperature stability and high oxidative stability



Pour Point Comparison to Other Oils

Cuphea oil (98%)

-42°C

Oleic Lauric

Oleic Myristic

Aeroshell

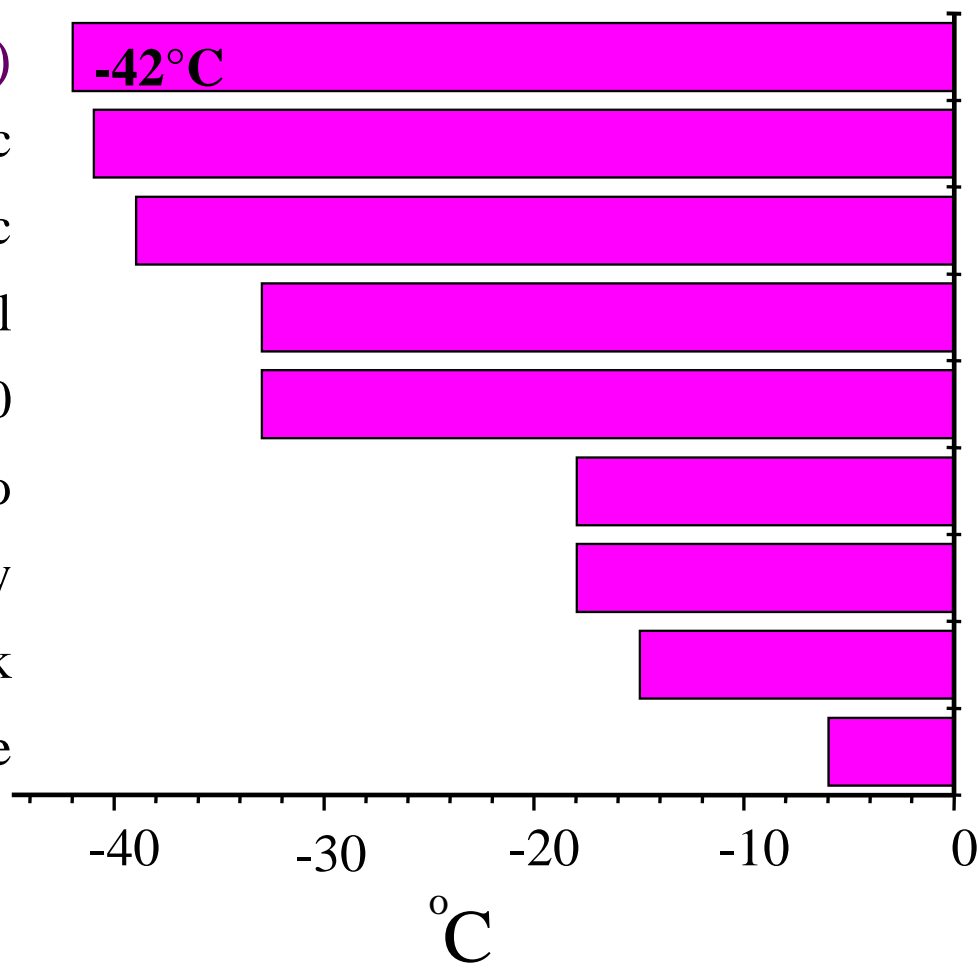
Valvoline 5W-30

Crambe Coco

BioSoy

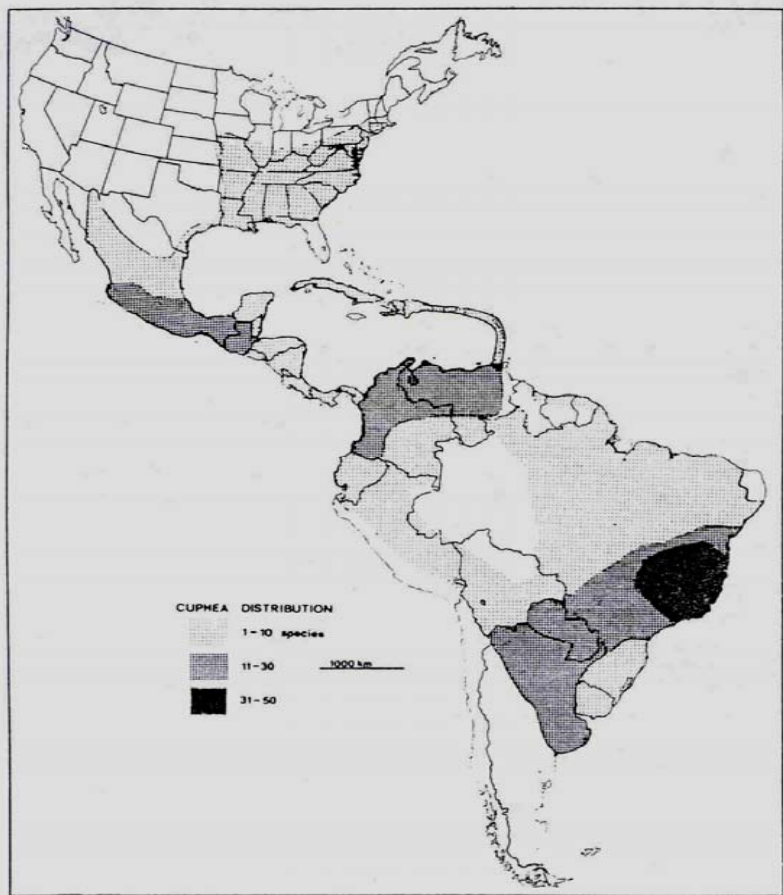
Soylink

Crambe





Cuphea (species) Range



Critical Reviews in Food Science and Nutrition Vol. 29,
Issue 2 (1989)

PSR-23

C. viscosissima x *C. lanceolata*

