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Cuphea Yields in Iowa, 2002

Frank Forcella

USDA Agricultural Research Service, Frank.Forcella@ars.usda.gov

Russell W. Gesch

USDA Agricultural Research Service, Russ.Gesch@ars.usda.gov

Gary B. Amundson

USDA Agricultural Research Service, Gary.Amundson@ars.usda.gov

Dean H. Peterson

USDA Agricultural Research Service, Dean.Peterson@ars.usda.gov

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Abstract

Cuphea is a potential source of lauric and capric acids, which are medium-chain-length fatty acids. They are used to manufacture various products such as detergents (lauric) and high quality lubricants (capric). The fatty acids are contained in oils that are produced and stored in cuphea seeds. Currently, all of the lauric acid used for detergents is derived from imported palm and coconut oils. There is no domestic source of this fatty acid, which is a dilemma that U.S. industries, such as Proctor & Gamble and ADM, would like to resolve.

Disciplines

Agricultural Science | Agriculture

Cuphea Yields in Iowa, 2002

Frank Forcella, research agronomist
Russ Gesch, plant physiologist
Gary Amundson, engineering technician
Dean Peterson, biological science technician
USDA-Agricultural Research Service

Introduction

Cuphea is a potential source of lauric and capric acids, which are medium-chain-length fatty acids. They are used to manufacture various products such as detergents (lauric) and high quality lubricants (capric). The fatty acids are contained in oils that are produced and stored in cuphea seeds. Currently, all of the lauric acid used for detergents is derived from imported palm and coconut oils. There is no domestic source of this fatty acid, which is a dilemma that U.S. industries, such as Proctor & Gamble and ADM, would like to resolve.

A genetic line of cuphea was bred from a cross between two species: *Cuphea viscosissima* and *C. lanceolata*. This genetic line is known as PSR-23, which is an abbreviation of "partial shatter resistance line number 23." As the name implies, the plant is not yet fully domesticated, and seed shattering remains an important agronomic problem.

The plant breeders Steve Knapp (Oregon State University) and Winn Phippen (Western Illinois University) are actively working on improving the crop characteristics of cuphea through classical and novel genetic approaches. In the meantime, our goal as agronomists is to understand the basic agronomic traits and needs of the plant, such as seeding depth, row spacing, planting date, harvesting methods, and so forth. Included in these goals is the determination of the regions within the USA where cuphea is adapted best.

Prior and contemporary trials on the West Coast and in Illinois resulted in disappointing plant

establishment, growth, and yields. In contrast, trials in western Minnesota from 1999–2001 were very promising. Thus, one of our objectives was to examine cuphea growth and yield along a latitudinal transect. In 2002 we established small plots of cuphea at seven research farms located from northwestern Minnesota to southwestern Iowa. The sites in Iowa were the ISU research farms near Calumet, Castana, and Lewis.

Materials and Methods

At each research farm, cuphea was sown on three dates, ranging from late April to late May, in each of four plots (four replications), which were arranged randomly within blocks. Prior to planting, plots were fertilized with the equivalent of 50-10-10 lbs/acre of N-P-K. Immediately after sowing, Sonalan or Treflan was applied at about 1 lb of active ingredient/acre and very lightly incorporated. The plots were not irrigated. Plots were visited monthly at which time escaped weeds were removed by hand. A 1-square-meter section (about 10 sq ft) of each plot was harvested by hand in October. Harvested plants were air dried and threshed, and seed yields were calculated/acre.

Results and Discussion

Planting date had no effect on yield. Overall seed yields were very low: only 47, 169, and 305 lbs/acre in Lewis, Castana, and Calumet, respectively. Although seed shattering played a role in such low yields, cuphea seed production largely reflected the drought conditions that prevailed in western Iowa during 2002. For comparison, yields were near the expected level of 1,000 lb/acre at Morris in west central Minnesota, where the amount and distribution of rainfall was good. As in Iowa, cuphea yields near Lamberton (southwest MN) also were low because of very dry summer conditions.

Trials will be repeated in 2003 and possibly will be supplemented by irrigation at some sites.