Crop Improvement and Utilization Research Unit
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NP306
Development of domestic natural rubber-producing industrial crops through biotechnology
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Developing a domestic source for production of ricinoleate and other industrial use fatty acids
Thomas McKeon (tmckeon@pw.usda.gov)

NP302
Molecular analysis of effects of environment on wheat flour quality and allergenic potential
William Hurkman (bhurkman@pw.usda.gov)

Molecular Tools to Minimize Risk in Genetically Engineered Crops
Ann Blechl (ablechl@pw.usda.gov)

NP301
Practical Application of Molecular Genetics for Improved Potato Cultivars
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The CIU Research Unit provides technical expertise in enabling commercial deployment of new technologies to improve crop plants. As demands for biofuels from crops increase, feedstocks will require improvement for commercial success. Plant biotechnology provides the fundamental tools for commercially viable feedstock improvement.

Residual plant material remaining after extraction of other bioproducts provides a source of lignocellulose for conversion to biofuels. The southwestern desert shrub guayule has been commercialized as a source of latex. Extraction of latex from this non-food industrial crop leaves a considerable amount of finely ground bagasse. The energy content of bagasse is high, particularly when resin is not extracted. Conversion to ethanol by standard methods has been accomplished, and various other means of producing liquid fuels from a guayule are under investigation. In addition, guayule resin is a useful bioproduct with applications as an adhesive, for example.

Castor oil and its methyl esters from castor seeds are an excellent biodiesel. The non-food industrial crop Castor is the highest yielding annual oilseed crop, with low input requirements. The oil can be used as a lubricity additive, and has less soot production. Improvements in Castor to reduce toxic proteins are under investigation.

As demand increases, biomass feedstocks will need improvement. Our expertise in plant biotechnology is focused on transgene assembly for improved bioenergy production. We have developed commercial transgene components, including precise and efficient expression systems, and new technologies for introduction of more than one transgene, including recombinase and chloroplast transformation technologies. Technology for intragenic

modifications in dual-use crops is under development. Design of feedstock improvement will also draw on our expertise in precise modulation of biochemical pathways.