

AGBIOTECHNOLOGY - OILSEED DEVELOPMENT II

III. Executive Summary (limited to one page)

Oilseeds is one of the fastest growing agricultural markets. It is driven by 1) the emerging and rapidly growing biodiesel industry, which uses canola and other oilseeds as feedstock; 2) shifts in demand for healthful oil traits in the United States and elsewhere; and 3) by the combined effects of increased demand for oils in foods world-wide. Oilseeds are strategic crops of great importance to North Dakota. We are the largest producer of canola, a crop with a number of important attributes. The oil content per acre of canola is high and exceeds that of soybeans and other competing crops. Its healthy attributes make it desirable for the food industry, and its cold-flow properties and lubricity properties make it a valuable feedstock for biodiesel production. The major factor limiting the growth of these sectors is the supply of canola as a feedstock.

Our partners, (Monsanto, the largest agbiotechnology developer, and Archers Daniels Midland, a major processor of oilseeds and biofuels in the United States), Mr. Shane Goettle, and others in the biofuels industry have urged us to accelerate and expand the COE on Oilseed Development and pursue objectives deleted earlier due to budgetary reasons. In response, this project will expand the current COE by developing drought tolerant and reduced shattering lines of *Brassica napus*, the traditional canola species that are adapted to acres south and west of the traditional canola growing region. *Brassica juncea*, a crop with similar oil properties as canola and adaptability to more arid regions will also be studied. The project will be accomplished by expanding our screening programs while incorporating winter nurseries and marker assisted breeding.

Primary beneficiaries are growers, who benefit from increased yields, reduced risks, and greater profits (by \$20-66 million/yr), and processors, who invest in processing plants in rural North Dakota. These are not fleeting opportunities. North Dakota dominates canola production and processing. Those processors employ high-paying technicians, professionals, and skilled laborers in their rural plants. Our targeted gain in oil content could support up to 10-12 new biodiesel plants each of which employ 80 or more people thereby increasing wealth in this sector of our economy.

Appendix 1
NDSU Center of Excellence for Oilseed Development II
Detailed Four-year Budget

COE Item	COE Budget
<i>Germplasm Development and Marker-Assisted Breeding</i>	
Salaries/benefits	\$ 415,000
Operating and supplies	450,000
Equipment	75,000
<i>AgBiosystems Eng: Quality Lab, Biofuel Testing (including prospects for collaboration)</i>	
Salaries/benefits	150,000
Operating and supplies	40,000
Equipment	0
<i>Marketing and Economic Analysis</i>	
Salaries/benefits	340,000
Operating and supplies	30,000
Equipment	0
<i>Total</i>	\$1,500,000

Matching Item	Match
<i>Cash</i>	
<i>ADM (Selected projects)</i>	80,000
<i>In-kind materials</i>	
<i>Monsanto: Germplasm Canola</i>	\$5,000,000
<i>ADM Quality Evaluation (estimated)</i>	580,000
<i>Total</i>	\$5,580,000

Details of the four year operating budget, broken down by years and activity.

	Year 1	Year 2	Year 3	Year 4	Total
<u>Germplasm Development and Marker-Assisted Breediing</u>					
Salaries/benefits	55,000	80,000	145,000	135,000	415,000
Operating and supplies	112,500	112,500	112,500	112,500	450,000
Equipment	75,000	0	0	0	75,000
<u>AgBiosystems Engineering: Quality Lab, Biofuel Testing</u>					
Salaries/benefits	37,500	37,500	37,500	37,500	150,000
Operating and supplies	10,000	10,000	10,000	10,000	40,000
Equipment	0	0	0	0	0
<u>Marketing and Economic Analysis</u>					
Salaries/benefits	70,000	80,000	110,000	90,000	340,000
Operating and supplies	7,500	7,500	7,500	7,500	30,000
Equipment	0				0

Budget Justification. The budget includes line items for each of the below. In each case, no new faculty positions are sought but instead the efforts will be conducted through existing faculty and/or professionals hired for the duration of the project. In most cases existing resources will be used and expanded to accomplish the accelerated and expanded initiatives

Germplasm Development, Breeding and Marker Assisted Breeding. One germplasm development leader exists. He is assisted by a new hire to work on the breeding and germplasm development efforts in canola. Funding is provided for two graduate students and faculty summer support. Operating funds are required to evaluate the advanced lines. This will include field rental both locally and for a winter nursery, as well as travel to the in-state and winter nursery sites. Personnel (graduate students) and research support of molecular marker analysis is also included. Some dedicated field and lab equipment will be required.

AgBiosystems Eng: Quality Lab, Biofuel Testing and Bio-Products (including prospects for collaboration) The quality lab and pilot plant have already been expanded so minimal additional expenditures are required. Funding is provided for one technician over the period of the project to assist Dr. Wiesenborn. In addition, funds are reserved to pursue varying forms of collaboration on the polymers initiative pending interests and further collaborative funding by the partners.

Marketing and Economic Analysis. Funds are provided for faculty summer support and one research scientist. This may be supplemented by a graduate student. These professionals will coordinate the project and will conduct specified marketing and commercialization studies. In addition, one will work on new product strategies.

Monsanto's' Contribution These are minor issues and can be resolved prior to submission to the COE commission: 1) Monsanto will provide germplasm valued at \$4-6 million, or more as noted in their letter; 2) At the appropriate time, they will provide a detailed listing of the germplasm lines, and valuation in an executive appendix; and 3) these are in addition to the additional lines added to their

contribution as well as use of equipment, winter nurseries in Chile, etc, under the current COE which were not valued, nor required.

Further, Monsanto had earlier provided cash contribution of \$250K which was to be credited toward the previous COE. However, with the reduced contribution from the COE Commission, they would expect their required contribution to be less. Hence, a portion of that is carried over and added as cash to the COE II proposal. However, we have not carried that funding into the budget nor request for the COE II. It is mentioned here as it is important there has been a cash contribution from Monsanto and these have and will be used to fund future related activities.

ADM's Contribution ADM's support continues and will be comparable to the previous COE.

In addition to testing, other forms of collaboration, as well as hiring of interns, ADM uses an internal procedure for collaborative projects such as proposed under the COE. This takes the form of identifying targeted research areas, developing proposals, identifying individuals or business units at ADM working in those areas, and then jointly submitting them to a review committee for funding approval. This is the source of anticipated cash contribution from ADM at \$80,000. We currently have 3 proposals going through that process. This will be the procedure they propose to use for funding specific projects under this COE, including technical work on biofuels, processing as well as explorative and joint work in polymers and coatings applications of these oils. The latter could be pursued jointly with other Centers or departments at NDSU.

Other Partners: This COE is built around the dominant players in the industry. We have taken the view that as others enter the industry, the project would be extended to them as well.