## 2016 Forever Green Initiative Projects

The Minnesota Department of Agriculture received $1 million of Clean Water Funds to support the Forever Green Agricultural Initiative at the University of Minnesota for fiscal year 2016. Eleven projects which focus on incorporating perennial and winter annual crops into existing agricultural practices were selected through a request for proposal process administered by the University.

| Project Title | Recipient (University of Minnesota) | Final Award Amount |
|---|---|---|
| Advanced Management Practices for Enhancing Profitability of Intermediate Wheatgrass | Craig Shaeffer | $98,233 |
| Advancing Hazelnut Micro-Propagation | Jerry Cohen | $125,000 |
| Agronomics Development of Winter Annual Oilseeds in a Field Corn Production System | Scott Wells | $149,764 |
| Developing Genomic Resources for *Helianthus divaricatus* to facilitate the Development of Perennial Sunflower for Food Protection and Wildlife Services | Yaniv Brandvain | $80,652 |
| Effect of Cover Crops on Water Use and Nitrogen Leaching in Corn and Soybean Cropping Systems | Axel Garcia y Garcia | $50,000 |
| Effect of Refinement and Dough Conditioners on the Quality of Intermediate Wheatgrass for Food Applications | Baraem Ismail | $125,000 |
| Field Pennycress Breeding Project Support | Jim Anderson | $90,132 |
| Integrating Winter Annual Cover Crops into Corn and Soybean Rotations in Minnesota | Gregg Johnson | $55,180 |
| Intermediate Wheatgrass Breeding Support using Phenotypic and Genotypic-based Selection Methods | Jim Anderson | $51,615 |
| Population Dynamics of Soybean Cyst Nematode in Winter Annual Oilseeds | Senyu Chen | $94,424 |
| Sustaining Hazelnut Breeding and Agronomic Research at the University of Minnesota | Lois Braun | $80,000 |

**2018-2019 Forever Green Initiative Projects**

The Minnesota Department of Agriculture received $1.5 million of Clean Water Funds to support the Forever Green Agricultural Initiative at the University of Minnesota for fiscal years 2018-19. Thirteen projects which focus on incorporating perennial and winter annual crops into existing agricultural practices were selected through a request for proposal process administered by the University.

| Project Title | Recipient (University of Minnesota) | Final Award Amount |
|---|---|---|
| Measuring intermediate wheatgrass root growth and morphology to enhance ecosystem services, prolong grain yield, and inform plant breeding | Jacob Jungers | $137,000 |
| Perennial Sunflower FGI | Robert Stuper | $139,000 |
| Enhancing winter hardiness of winter barley for end-user and environmental benefit: a blueprint for winter-hardy Forever Green crops | Walid Sadok | $139,000 |
| Evaluating Pennycress Oilseeds for Food Applications | Baraem Ismail | $139,500 |
| Optimizing the use of Intermediate Wheat grass (IWG) for the baking and brewery industries | George Annor | $139,250 |
| Programmable Freezer for Improving the Winter Survival of Perennial Crops | Eric Watkins | $26,500 |
| Field Pennycress Breeding Project Support | Jim Anderson | $137,250 |
| Allelic Diversity of Kernel Hardness in Intermediate Wheatgrass and Associated Variation in the Protein Profile | Jim Anderson | $63,700 |
| Breeding perennial flax for unique ecosystem and high value crop services for Minnesota producers | Neil Anderson | $139,500 |
| Overcoming the barriers to root initiation in hazelnut | Jerry Cohen | $133,000 |
| Improving harvestable yield and production value of silphium through crop management and seed processing | Kevin Smith | $139,000 |
| Soil temperature effects on SCN development in pennycress and resistance discovery | Senyu Chen | 136,800 |
| Forever Green Initiative programmatic support | Don Wyse | 30,000 |

## 2020-2021 Forever Green Initiative Projects

The Minnesota Department of Agriculture received $3.4 million of Clean Water Funds to support the Forever Green Agricultural Initiative at the University of Minnesota for fiscal years 2020-21. Thirteen projects which focus on continued development of perennial and winter annual crops were selected through a request for proposal process administered by the University.

| Project Title | Recipient (University of Minnesota) | Final Award Amount |
|---|---|---|
| Applied Genomics Assisted Breeding to Improve Long-Term Yield Potential of Intermediate Wheatgrass | James A. Anderson | $349,775 |
| Low-risk, high-reward agronomic trials to enhance Kernza development and deployment | Jacob Jungers | $309,283 |
| Expanding the field pennycress breeding program for variety development and rapid response to new challenges | James A. Anderson & Katherine Frels | $309,034 |
| Unlocking the physiological and environmental mechanisms of Kernza interannual yield decline | Walid Sadok | $309,319 |
| Improving the commercial viability of intermediate wheatgrass (IWG) through the development of value-added ingredients and new products | George Annor | $307,419 |
| Impacts of Kernza on water uptake and nitrogen leaching in SW Minnesota wellhead protection areas | David Mulla | $305,085 |
| Utilizing genetic tools to identify winter camelina lines with early maturity, high protein and reduced glucosinolates | M. David Marks | $201,150 |
| Advancing breeding of Silphium integrifolium as a perennial oilseed crop for Minnesota | Kevin P. Smith | $309,377 |
| Production Scale Deployment of Forever Green Cropping Systems: Agronomic, Economic, and Environmental Aspects | Joshua Gamble | $305,465 |
| Evaluating Camelina and Pennycress as Novel Sources of Plant Protein | Baraem Pam Ismail | $309,377 |
| Pennycress and Soybean Cyst Nematode: A solution-oriented approach | Kathryn Bushley & Senyu Chen | $184,717 |
| Genetic structure of perennial flax to enable identification of genes influencing agronomic and horticultural traits | Neil O. Anderson | $150,000 |
| Developing spring and winter pea as profitable and environmentally friendly crops for Minnesota | Robert Stupar | $150,000 |