



PROJECT TITLE: Palmer Amaranth Detection and Eradication

I. PROJECT STATEMENT

Palmer amaranth is an invasive plant that threatens row crop production and prairies. Growing quickly at 2-3 inches per day and reaching heights of 10 feet tall, it outcompetes other plants. Palmer amaranth is an annual that produces prolific seed – up to a million per plant. It developed resistance to multiple classes of herbicides making it challenging to control. Palmer amaranth can cause yield losses up to 91% in corn (Weed Sci. 49:202-208) and 78% in soybeans (Weed Sci. 51:37-43). It has invaded established prairies in Illinois.

Palmer amaranth was first found in Minnesota in fall 2016 and declared an agricultural emergency. Palmer amaranth seed was a contaminant of a conservation seed mix that was planted at 30 locations. Infrastructure developed with our *Elimination of Target Invasive Plant Species* LCCMR project and Minnesota Department of Agriculture (MDA) emergency funds enabled us to respond quickly. Palmer plants, including seedheads, were incinerated to reduce establishment and spread. There are currently less than 200 acres of Palmer amaranth in Minnesota and the density is low. Rapid and effective management now could prevent statewide establishment and spread. We will

- **Intensively monitor sites with Palmer amaranth.** Vegetation at Palmer sites will be monitored closely to identify Palmer plants before seed is produced. Palmer germinates throughout the growing season so monitoring the entire season is needed. Palmer amaranth seedbanks are not long-lived so aggressive management now could eradicate Palmer from these sites.
- **Continue control efforts at sites with Palmer amaranth.** Control methods may include flame weeding with torches, prescribed fire, spot treatment, increased plant competition by seeding more native grasses and, if necessary, broadcast herbicide application (ENRTF dollars will not be used for broadcast application).
- **Conduct ground and aerial surveys.** Additional conservation planting will be surveyed for Palmer amaranth presence or absence. Aerial survey will increase efficiency of ground survey by advance scouting for Palmer or similar looking plants. It will also reduce the amount of field entries and exits thereby reducing the risk of inadvertent spread of Palmer.

We request funding from the emerging issues account for Year 1 and continuation funding for Years 2 and 3 with the 2018 proposal process. The emerging issues funding will enable us to survey and manage Palmer amaranth during the 2017 growing season, before further establishment and spread. MDA is using existing project funds to hire a survey specialist now but needs additional funding to continue work.

II. PROJECT ACTIVITIES AND OUTCOMES

Emerging Issues Funding Request for project to begin July 1, 2017

Activity 1: Monitor, survey and control

Budget: \$ 173,000

We will regularly monitor existing infestations to look for Palmer and determine control steps needed. We will survey additional conservation plantings both on the ground and with drones. Prescribed fire and flame weeding are methods that will control Palmer amaranth while benefitting native species in conservation plantings. Initial drone survey will focus on imaging fields. This is relatively simple and the technology and methods are largely developed. For aerial survey method testing, we request to use project funds for out of state travel to areas where Palmer is more common such as Iowa for method testing.



Outcome	Completion Date
1. Infestations will be monitored during the growing season a minimum of three times per year. Palmer plants will be controlled prior to seed development. Currently there are 30 locations to monitor in Lyon and Yellow Medicine Counties.	10/31/18
2. At least 75 additional conservation plantings statewide are surveyed each year for the presence/absence of Palmer amaranth. Selection of sites to survey will be based on geographic distribution and newer plantings will be prioritized.	10/31/18
3. Investigate potential infestation reports from the public and agency partners. We anticipate approximately 300 reports per week during the growing season.	10/31/18
4. A minimum of 30 plantings will be imaged using a drone.	10/31/18
5. Utilize prescribed fire and flame weeding to control Palmer amaranth.	10/31/18

III. PROJECT STRATEGY

A. Project Team/Partners

Receiving funds: Monika Chandler (MDA) will lead infestation monitoring, ground survey and report follow up. She will also provide overall project coordination. Demoz Gebre Egziabher (U of M) will lead the development and utilization of aerial survey methods. Dustin Looman (CCM) will manage crews and lead Palmer amaranth control activities. Their salaries will not be paid with these funds. All organizations will provide in-kind equipment, facilities and GIS/technical support.

Not receiving funds: We will collaborate with federal and state agencies and private landowners to identify sites to survey and to manage Palmer infestations.

B. Project Impact and Long-Term Strategy

Palmer amaranth eradication would have enormous positive ecological and economic implications. If Palmer amaranth becomes widespread in cropping systems, additional herbicides would be used. This could be detrimental to pollinators and water quality. Crop production costs would increase by an estimated \$20-30 per acre for soybean and \$15-20 for corn production. If half of Minnesota’s 7.4 million acres of soybeans and 8.7 million acres of corn were infested, production costs would increase by approximately 165 million dollars annually. This burden would be borne by farmers and consumers and does not take into account the threat of non-target treatment impacts to surrounding agricultural natural areas. Additionally, Palmer amaranth is becoming problematic in prairie in Illinois and is outcompeting native vegetation. The stakes are high. There is not much Palmer amaranth in Minnesota. Now is the time to control it and keep it out of conservation plantings.

Despite efforts to prevent contaminated seed from entering Minnesota, we anticipate additional introduction of Palmer amaranth. Early detection and rapid response to Palmer amaranth will be an ongoing effort.

C. Timeline Requirements

Emerging issues funding would be for 07/01/2017 to 10/31/2018. If continuation funding is secured, standard ENRTF funding would be for two years from 07/01/2018 to 06/30/2020. The time overlap in summer 2018 will ensure funding continuity while contracts are written. The total funding amount would not increase because of this overlap period.

2018 Detailed Project Budget

Project Title: Palmer Amaranth Detection and Eradication

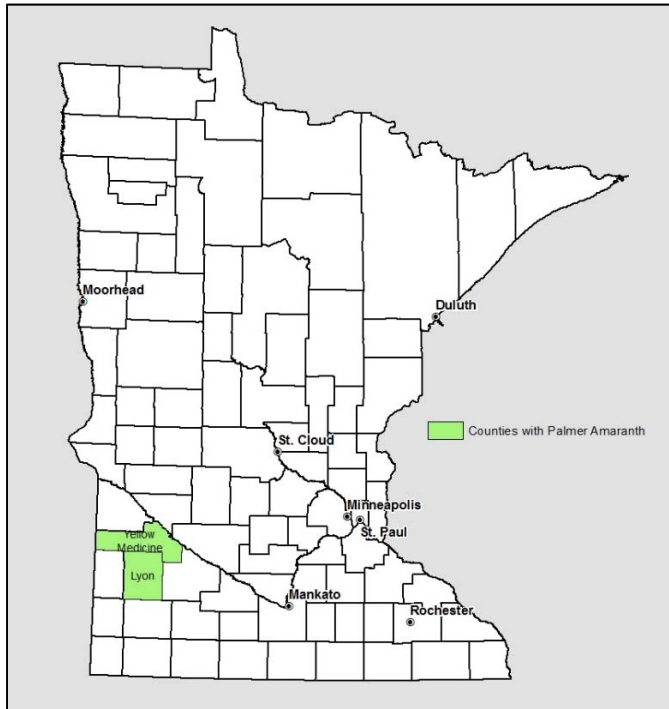
IV. TOTAL ENRTF REQUEST BUDGET

BUDGET ITEM	Emerging Issues
MDA Personnel: One full time Plant Health Specialist position estimated salary \$38,000 per year plus fringe benefits @ 46% for survey and coordination	\$56,100
Professional/Technical/Service Contracts: Contract with Conservation Corps Minnesota for Palmer amaranth survey and management in conservation areas. Management methods include spot herbicide application, flame weeding and prescribed burning. Training and equipment for crews is included.	\$38,000
Professional/Technical/Service Contracts: Contract with University of Minnesota to develop and utilize aerial survey methods. Costs include a post-doc \$63,050 (salary \$49,000 and fringe @ 22.4% \$14,100), travel \$7,900 (mileage \$5,400 and meals and lodging \$2,500), and other (repairs \$1,000 and specialized pix4d software license \$2,900)	\$74,900
MDA Travel: Fuel @ 15,000 miles (\$2,000), approximately 27 days of lodging/yr (\$2,700) and 100 days of meals/yr (\$3,400)	\$4,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$173,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	STATUS
Other State \$ To Be Applied To Project During Project Period: MDA Emergency Funds M.L. 2016, Chp. 17, Sec. 17.041, Subd. 1	\$ 24,000	Secured
	\$ 28,200	Encumbered
In-kind Services To Be Applied To Project During Project Period: MDA: Overhead, field equipment, computing/software, GIS and data management, and project management (\$12,000); U of M: UAV Lab equipment (\$10,000); and CCM: Approximate \$2.50/hr difference between actual cost per member (\$23.50/hr) and billing rate (\$21.00/hr) = \$4,500.	\$ 26,500	Secured
Current ENRTF Appropriation: 2017 Elimination of Target Invasive Plants - Phase 2 project M.L. 2016, Chp. 186, Sec. 2, Subd. 06e1 and Subd. 06e2	\$ 750,000	Spent or obligated
Past ENRTF Appropriation: 2017 Elimination of Target Invasive Plants - Phase 1 project M.L. 2013, Chp. 52, Sec 2, Subd. 06d	\$ 350,000	Spent
Other Funding History: MDA Emergency Funds	\$ 47,800	Spent

Palmer Amaranth Detection and Eradication



Palmer amaranth was detected in Yellow Medicine and Lyon Counties.



Palmer amaranth's long seedheads produce a lot of seed that enables spread.



Conservation Corps Minnesota burning Palmer amaranth in a conservation planting

June 16, 2017

Legislative-Citizens Commission on Minnesota Resources
100 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 65
St. Paul, MN 55155

Dear Members of the Legislative-Citizens Commission on Minnesota Resources,

I am writing in support of the proposal by the Minnesota Department of Agriculture (MDA), University of Minnesota (U of M), and Conservation Corps Minnesota (CCM) entitled **Palmer Amaranth Detection and Eradication**.

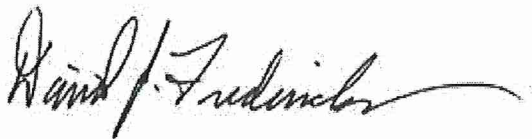
Palmer amaranth is a serious threat to row crops and prairies because it overgrows and outcompetes crop and native plants. This can substantially reduce yields in crops and limit diversity in native plantings. Because of the plant's resistance to many herbicide classes, controlling Palmer amaranth is expensive and challenging. For these reasons, I declared Palmer amaranth an agricultural emergency in Minnesota on October 27, 2016.

Now is the time for rapid and effective management. There are currently less than 200 acres with Palmer amaranth in Minnesota, and Palmer amaranth density in these plantings is currently low. Failure to address these small infestations will result in damage and increased costs for farmers and natural resource managers.

Our proposal seeks funding from your Emerging Issues account to find and control Palmer amaranth in conservation plantings with a combination of ground and aerial survey work. MDA emergency funds were used to initiate control work last fall and this spring with backpack flame weed torches and prescribed fire. These treatments were effective. No Palmer amaranth seedlings were found when sites were monitored on June 2, 2017. This is great news but Palmer amaranth can germinate throughout the growing season so we must remain vigilant and continue to monitor. We need to continue controlling Palmer where it is found. We also need to check other conservation plantings for Palmer. We must do this work now or we will backslide and Palmer could get away from us.

With a narrow window of opportunity to extinguish Palmer, we must respond quickly and effectively. I ask for your support of this project and encourage swift action.

Sincerely,



David J. Frederickson
Commissioner