GRANTS PROGRAM: THE CENTER FOR PRODUCE SAFETY

CPS Regionally Coordinated Agricultural Production–Water Treatment Baseline Program Background and Description

Full Proposal (by invitation only) – Due by 12:00 noon PST on Tuesday, August 20, 2019

The Center for Produce Safety (CPS) is a 501(c)(3), U.S. tax-exempt, charitable organization focused exclusively on providing the produce industry and government with open access to the actionable information needed to continually enhance the safety of produce.

Background

Microbiological quality characterization and management of agricultural water (ag water) is immensely important to preventative food safety systems. Since its formation, CPS has funded over $6 million in research projects with aims specific to, or directly impacting, knowledge and practice in preharvest ag-water risk reduction and industry best practices. CPS has supported 36 projects, domestically and internationally, since 2008. CPS-funded research in ag water may be grouped into four key knowledge and tools areas:

1. Indicators – regional surveys and validation of current/emerging fecal contamination analytes
2. Index – single or microbiome-derived surrogates for fecal contaminant or pathogen potential
3. Sampling Design and Regimes – how often, when, where, how much?; risk assessments
4. Pathogen Control and Corrective Measure Treatment – best practices, environmental and soil health impacts

Following the pattern of multiple outbreak events, particularly from 2017 to 2018, and the strong association with continuing ag-water risk concerns, a separate request for proposals (RFP) was approved by the CPS Board of Directors and its Executive Committee. Priority needs in ag-water research, leading to immediate and near-term solutions and pathways for dynamic change in risk reduction, were solicited. Input was received from all sectors of the produce supply chain, public health agencies, and academia. A judicious and in-depth review of the scope of science and the portfolio of past and current CPS funding commitments, on this priority issue, led to a consensus priority focus for this ag-water RFP on antimicrobial treatment as a preventive control and corrective measure.

Many fundamental and practice/region/commodity–specific knowledge gaps in grower guidance and microbial water quality profile assessments and management challenges remain to be addressed. However, it is clear that the current critical priority is for broadly applicable science-based knowledge and solutions to risk minimization through antimicrobial treatment(s) of irrigation and crop management water. CPS has determined that research areas 1 to 3 (above), while still needed and valuable, are presently saturated from a practical outcome perspective or awaiting final project results to determine priority directions for continued support. Determining the underlying consistencies and diversity challenges in ag-water treatment, verification and monitoring protocols, and underlying best practices is the greatest opportunity for developing grower-support solutions. These practical solutions must be based on scientifically valid and standardized datasets that will support sound policies and compliance metrics development.

Purpose

The purpose of this RFP is to solicit proposals detailing administrative management, plans to conduct required baseline datasets, and proposed associated relevant research activities. Any proposal must address a region specifically and provide guidance to the produce industry for technical implementation and knowledge of the efficacy of antimicrobial treatment of agricultural water. For the purpose of this RFP, the term **agricultural water** (**ag water**) is defined as is specified in the FSMA Final Rule on Produce Safety – Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption (https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-produce-safety), but will be limited in scope to *"water (that is) intended to, or is likely to, contact covered produce…"* during crop production, including all phases and uses in preharvest management. The RFP's standardized baseline-setting projects seek to develop broadly acquired and statistically comparable datasets that support a portfolio of water treatment options. Proposals should include research that addresses scientifically valid process control parameters, including models, for pathogen lethality in diverse surface water sources used for fresh-consumed specialty crop production systems. These validation studies should be designed to be consistent with the norms of both regional preharvest water application and on-farm water quality constituent composition. Experimental plans must reflect a range of common retention or treatment contact timeframes during conveyance to the point of application to a crop. In this first RFP phase, CPS is limiting the RFP application solicitation to five domestic regions (within the continental U.S.), including states in the West, Midwest, Southwest, South, New England - Mid-Atlantic, and Mid-Atlantic regions (see Fig. 1 map).

RFP Anticipated Outcomes

The development of proposals should incorporate a work plan designed to fulfill the desired data-based knowledge for industry implementation, ag-water quality verification guidance, and near-future research translational outreach programs, including:

- A broad national view of the intersection between inherent surface water quality and antimicrobial treatment process-control definition.
- A broad practical knowledge foundation built on scientifically valid and on-farm dose definition parameters for locally and regionally variable surface water.
- A broad national view and model(s) based on comparable datasets for sound development and evolution of standards and metrics.
- Increased practical knowledge on system performance expectations against emerging industry and future regulatory and enforceable metrics.
- Grower guidance and Best Practice SOPs in water treatment system design, engineering, monitoring, and verification protocols.

Award Structure

The successful proposals will be selected from, and administratively contracted with, a single prime-awardee institution representing each region. There is no restriction on the number of sub-awards distributed across a region to achieve the regional profile proposed. The distribution of funds awarded will be based on regional size, structure, contributions to the fresh produce supply chain, and scientific merit and strength of the proposal.

All awards will be based on a **single-year cycle**, with the budgeted term consistent with regional production seasonality and use of ag water from surface sources for irrigation or other crop management practices. Proposals should include a contractual budget starting date of November 1, 2019, and all projects must be completed by April 30, 2021 (final report due April 30, 2021).

Region (see Fig.1)	CPS Planned 1-Year Funding Level	Matching Funding Required
New England - Mid-Atlantic	$ 150,000.00	Yes
South	$ 225,000.00	Yes
Midwest	$ 175,000.00	Yes
Southwest	$ 200,000.00	Yes
West	$ 250,000.00	Yes

Award Requirements and Commitments

All proposals must include a description of, minimally, five open environment study sites. Ideally these sites would be at an on-farm surface water source distributed across a regional project zone, but may include a public access location of an environmental or surface water conveyance system available for specialty crop grower use. All proposed private, on-farm source sites must be supported by a Letter of Cooperation signifying commitment to provide access for the duration of the project.

To achieve the desired goal of a robust and comparable dataset matrix of diverse surface water sources and antimicrobial treatment systems, **secured commitment for 100 percent regionally-acquired matching funds** must be demonstrated in the proposal. To be clear, this requirement is a **real dollar for real dollar match** for technical staff salaries and benefits, consumable laboratory and field sampling or research supplies, travel to sampling and research sites, and enabling analytical equipment or services directly applicable to the project and associated proposed research objectives. Allowable proposed matching funds do not include in-kind dollar calculations for a non-budgeted individual's time (i.e. principal investigator, technical staff or advisor, administrator, contracted advisor/service provider, farming operation, or ag-chemical company technical services). Qualifying in-kind matching funds for a donated commercial-scale antimicrobial treatment system (including novel pilot-scale systems) will be considered by CPS, based on a projected least cost value for the fractional time interval of use in on-farm studies.

PI Methods & Standards Coordination Meeting

All proposals must include a travel budget for the PI to attend an organizational and coordinating meeting on November 13–14, 2019 (half-days, location to be determined). The purpose of this collaborative meeting among researchers, industry, affiliated service providers, and other invited stakeholders and subject matter experts is to finalize the uniform and standardized dataset matrices, including components for ag-water quality constituent analysis, descriptive water treatment system engineering, on-farm water treatment system characterization, environmental conditions during treatment, antimicrobial application, monitoring, and performance verification, including minimal microbiological profiles of non-treated and treated water to be standardized across each regional award.

Unified Baseline Publication

All prime award PIs and their sub-award Co-PIs must agree to participate in the publication of a general interest, peer-reviewed article reflecting the combined and consolidated standardized datasets from all regions. At this time, an open-access article in the Journal of Food Protection is anticipated. Completed research or modeling outside of this required and standardized data matrix, within the award granted by CPS, may be published by the individual researcher or research team at-will following standard CPS notification policies.

Timeline

Webinar for scientists interested in submitting a proposal: June 4 @ 10:00am Pacific – strongly encouraged. For details, please check CPS website, www.centerforproducesafety.org.

Submit intent to apply: by Monday, July 1, 2019 @ 12:00 noon Pacific Standard Time

Submit proposal: by Tuesday, August 20, 2019 @ 12:00 noon Pacific Standard Time

Award recipients notified: by Wednesday, September 25, 2019

PI Methods & Standards Coordination Meeting: Nov 13–14, 2019 (location to be determined)

Guidance and required proposal forms – CPS Website

CPS Regionally Coordinated Agricultural Production-Water Treatment Baseline Program

***2019 Ag Water Treatment Request for Proposals – Background and Description**

***2019 Ag Water Treatment Request for Proposal Guidance: Full Proposal**

***2019 Ag Water Treatment Proposal forms**

*May be found on the CPS Grant Opportunities webpage – www.centerforproducesafety.org/grant_opportunities.php

Appendix

Fig. 1 – Regional RFP Prime Award Map

Table 1 – Water Quality Analysis Matrix

Table 2 – Antimicrobial Treatment Parameter and Analysis Matrix

Examples of additional research objectives of interest to CPS

- Comparison of pH adjusted and non-adjusted log-reduction performance
- Model system pathogen log-reduction challenge studies with on-farm surface water sources

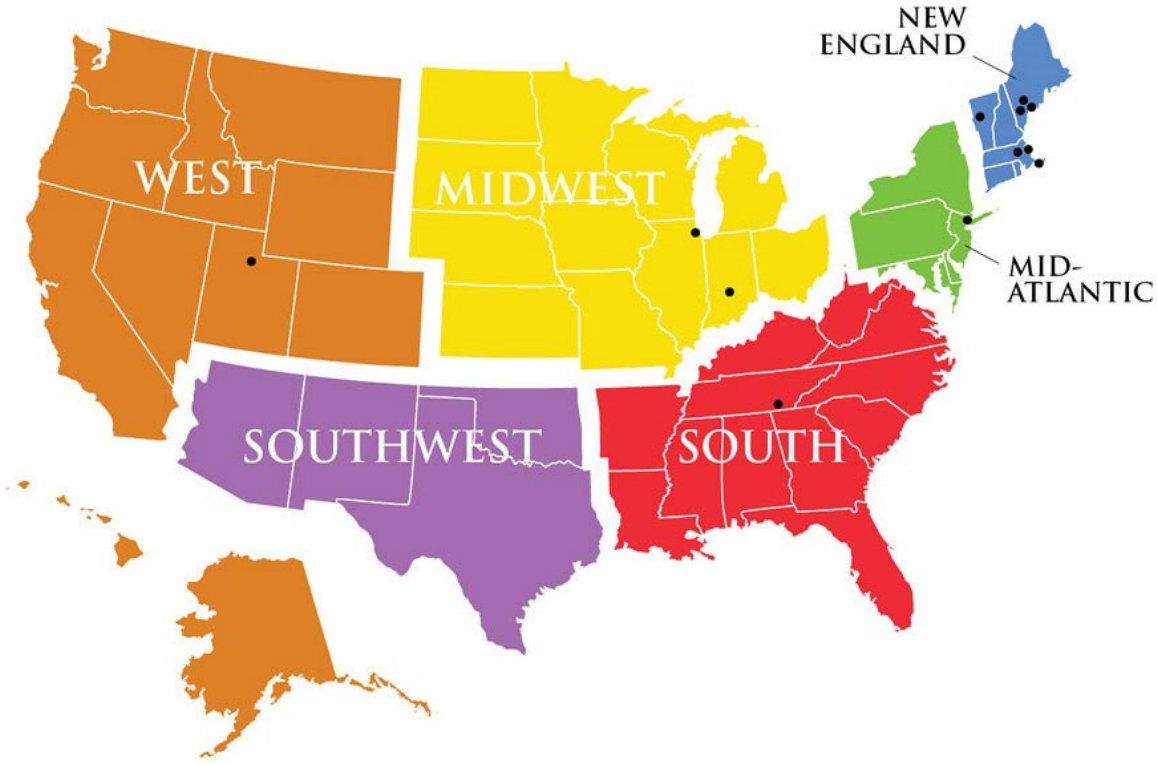
- Comparison of rapid methods for real-time verification of log-reduction metrics/goals
- Comparison of multiple antimicrobials per location × time
- Increased time-points for measured antimicrobial log-reduction from system start-up to fully pressurized
- Impact of variable antimicrobials and/or variable rates on inoculated surrogate(s) survival in treated water
- Impact of antimicrobial treatment on survival of surrogate(s) inoculated onto plant pre-irrigation: treated vs. non-treated
- Impact of antimicrobial treatment(s) on indigenous culturable and non-culturable microbiome survival on crop: treated vs. non-treated
- Impact of antimicrobial treatment(s) on indigenous culturable and non-culturable microbiome survival in soil: treated vs. non-treated

Appendix:

Fig. 1 – Regional RFP Prime Award Map

Five Regions ◆ Five Prime Awards ◆ Funding Prioritized by Region

◆ Minimum of Five Sites in Region



Required Standard Measurements to Facilitate Data Analysis and Informative Models

Table 1. Minimally Required Water Quality Constitutive Analysis Matrix

DATE	SITE CODE	TIME	TEMP (◦C)	pH	Solar UV	TSS	TDS	DOM	NTU	COD	Chlorine Breakpoint to 4 mg/L FC

Table 2. Antimicrobial Treatment Parameter and Performance Analysis Matrix

Antimicrobial Treatment (1×, 2×, 3×)	Flow Rate	Target Dose	Time – Hydrologic Tracer to First Emitter Line	Time – Hydrologic Tracer to Last Emitter Line	Measured Dose at full pressurized system		Pre-Treatment Total Coliform					Post-Treatment Total Coliform				
					First Emitter	Last Emitter										
Trial 1 to 5																