



# - Request for Pierce’s Disease Research Proposals –

- Issued December 1, 2012 -

The California Department of Food and Agriculture’s Pierce’s Disease and Glassy-winged Sharpshooter Board (CDFA PD/GWSS Board) is currently accepting proposals for Biological and Economic research on Pierce’s disease and its vectors.

## Types of Proposals

- **Biological Research Proposals:** Proposals are being requested for projects that will contribute to finding solutions to this serious disease of grapevines and that are relevant to California conditions.
- **Economic Research Proposals:** Proposals are being requested for projects that will contribute to an understanding of the economic impact of PD/GWSS on agriculture. Note that proposals may be strengthened by delineating and building on economic lessons from diseases other than PD/GWSS in terms of impacts of the diseases themselves relative to control approaches and policies.

Proposals are due via electronic submission on January 31, 2013. Research contracts will be awarded for one to three years, beginning with fiscal year 2013-14 (July 1, 2013 to June 30, 2014). For projects awarded two or three years of funding, receipt of a subsequent year of funding will be contingent upon satisfactory progress being made during the prior year.

## **Timeline**

- Request for Proposals Released ..... December 1, 2012
- Proposals Due ..... January 31, 2013
- Award Notification..... May 10, 2013
- Start Date for Projects ..... July 1, 2013

## **Funding**

- The CDFA Pierce’s Disease Research Program is funded by a special assessment paid by the California winegrape industry. Prior awards have ranged from \$19,000 per year to \$246,000 per year, with projects ranging 1-3 years in duration.

## **General Information**

- Funding preference will be given to projects deemed likely to yield results that expedite and/or directly yield applicable industry solutions or provide insight into the economic impacts of PD/GWSS and its possible solutions. Research priorities have been identified by the CDFA PD/GWSS Research Scientific Advisory Panel and are presented in Attachment A of this RFP. Proposals in other areas relevant to PD/GWSS management will also be considered.
- Multi-disciplinary team projects are encouraged.
- Researchers are responsible for obtaining all required governmental permits for working with live plant pests. For more information, please visit the following websites:
  - California permits: <http://www.cdfa.ca.gov/phpps/permitsandregs.html>
  - Federal plant pest permits: [http://www.aphis.usda.gov/permits/ppg\\_epermits.shtml](http://www.aphis.usda.gov/permits/ppg_epermits.shtml)
  - Federal biotechnology permits: [http://www.aphis.usda.gov/permits/brs\\_epermits.shtml](http://www.aphis.usda.gov/permits/brs_epermits.shtml)

- Submitted proposals and progress reports will not be returned. Confidential information and materials should not be submitted.
- Periodic progress reports and a final report will be required for each funded project (please see Attachment C for more information). Funded researchers are also expected to attend and report on their progress at the annual Pierce's disease research symposium. The proceedings from prior symposia are available at [http://www.cdfa.ca.gov/pdcp/Research\\_Symposium\\_Index.html](http://www.cdfa.ca.gov/pdcp/Research_Symposium_Index.html).
- The research sponsor is committed to providing public access to data in a timely fashion in order to maximize progress and hasten the discovery of solutions to Pierce's disease. Therefore, similar to federal grant programs, funded researchers may be required to post project information, including progress reports and certain types of data (e.g., gene sequences, expression data, etc.), on designated websites (please see Attachment B for more information).
- Information on past and current research is available at <http://www.piercesdisease.org/>. Researchers are encouraged to review this information to ensure proposed research represents new ideas or approaches.
- This RFP document is available online at: <http://uvegrants.ucdavis.edu>.

### Eligibility

- Any individual or group that will conduct proposed research on behalf of a public university or governmental agency is eligible and encouraged to submit proposals.

### Format and Content of Research Proposals

- See Guidelines.

### Definitions of Participant Responsibilities

- **Principal Investigator (PI):** The Principal Investigator is the person with overall responsibility for the scientific conduct of the project and for expenditures of funds. Each project has only one PI.
- **Co-Principal Investigator (Co-PI):** A Co-Principal Investigator is a person who receives research support or material of significant value from the project. A project may have more than one Co-PI.
- **Cooperator:** A Cooperator is a person who provides advice, materials, or data to the project, makes arrangements for advancement of project activities, uses results developed in the project, and/or carries out research in parallel to the project research and which is mutually beneficial. A Cooperator does not receive research support or material of significant value from the project. A project may have more than one Cooperator.

### Review Process and Criteria

Proposals will be reviewed by review panels and possibly also individual *ad hoc* reviewers. In addition, the PD/GWSS Board's Research Screening Committee will review and make recommendations to the PD/GWSS Board for funding of proposals. The PD/GWSS Board will then make a funding recommendation to the Secretary of CDFA.

**Biological Research Proposals** will be reviewed and evaluated in the following areas (100 points possible):

- **Objectives of Proposed Research, and Relevance** - Are the objectives clearly stated, justified, worthwhile, and reasonable? Is the proposed research likely to contribute significantly to solving the problem? Does the proposed research unproductively overlap with other research? (20 points)
- **Experimental Procedures to Accomplish Objectives** – Is the work plan reasonable, feasible and capable of meeting the stated goals and objectives? Is the work plan of good scientific merit? (40 points)

- **PI, Co-PI(s) & Others** – Do they have appropriate backgrounds, expertise, experience, and capabilities for the proposed tasks? Is the team missing any critical capabilities? (10 points)
- **Research Capacity & Likelihood of Accomplishing Objectives** – Assuming that requested funds are awarded, will the investigators have the resources, including facilities, to achieve the objectives? (10 points)
- **Research Timetable for Project** – Are the milestones appropriate? Are they achievable? (10 points)
- **Budget** – Is the budget reasonable and appropriate, including support for Co-PI activities? (10 points)

**Economic Research Proposals** will be reviewed and evaluated in the following areas (100 points possible):

- **Objectives of Proposed Research, and Relevance** - Are the objectives clearly stated, justified, worthwhile, and reasonable? Is the proposed research likely to contribute significantly to understanding the problem? Does the proposed research unproductively overlap with other research? (20 points)
- **Methodology and Procedures for Accomplishing Objectives (Workplan)** – Is the workplan reasonable, feasible and capable of meeting the stated goals and objectives? Is the workplan likely to yield the targeted data and information (40 points)
- **PI, Co-PI(s) & Cooperators** –Do they have appropriate backgrounds, expertise, experience and capabilities for the proposed tasks? Is the team missing any critical capabilities? (10 points)
- **Research Capacity & Likelihood of Accomplishing Objectives** – Assuming that requested funds are awarded, will the investigators have the resources, including facilities, to achieve the objectives? (10 points)
- **Research Timetable for Project** – Are the milestones appropriate? Are they achievable? (10 points)
- **Budget** – Is the budget reasonable and appropriate, including support for Co-PI activities? (10 points)

### Due Dates for Submissions

Proposals should be submitted electronically via the internet **no later than January 31, 2013**. Submit proposals online at <http://uvegrants.ucdavis.edu>. It is not necessary to submit printed copies.

Proposals that are incomplete, late, or exceed the maximum page length (10 pages + title page, budget, current, planned, pending, and recent PD/GWSS research support, biographies, and citations; 11-point Arial font; one-inch margins) may be eliminated from consideration.

### Questions

Questions about this RFP may be directed to the CDFA Pierce's Disease Control Program at 916-900-5024 or [pdresearch@cdfa.ca.gov](mailto:pdresearch@cdfa.ca.gov).

# RESEARCH PROPOSAL FORMAT AND GUIDELINES

Proposals should not exceed the maximum page length (10 pages + title page, budget, current, planned, pending, and recent PD/GWSS research support, biographies, and citations). Please use 11-point Arial font, and one-inch margins. Submit online at <http://uvegrants.ucdavis.edu>, where much of the information requested below can be entered in the corresponding blanks or as checked boxes. Electronic submissions are due **no later than January 31, 2013**.

## **Project Type**

Please indicate if this is a Biological Research Proposal or Economic Research Proposal.

## **Project Title**

Please give the title of the proposal, in 150 or fewer characters. If this is a continuing project and you are changing the title, please explain why.

## **Signature and Authorization Page**

Please furnish proof of authorization and agreement to conduct the proposed research by providing required institutional approvals and signatures of the PI, Co-PIs, and Cooperators.

## **Principal Investigator (PI)**

Please see the definitions for PI, Co-PI and Cooperator on page 2. Indicate the PI, i.e., the person responsible for overall project management, coordination, and execution. Include institutional affiliation, address, phone number, and e-mail address.

## **Co-Principal Investigators (Co-PIs)**

Please include institutional affiliations, addresses, phone numbers, and e-mail addresses. Indicate the roles of each Co-PI and make sure that each Co-PI is aware of his/her proposed participation.

## **Cooperators**

Please indicate the roles of each cooperator, and make sure they are aware of their proposed participation.

## **Research Area**

Please indicate, from the following list, the one primary research area in which the project falls, as well as any secondary areas:

- Crop Biology
- Disease Epidemiology
- Pathogen Biology & Ecology
- Pathogen & Disease Management
- Vector Biology & Ecology
- Vector Management
- Vector/Pathogen Interaction
- Economic Effects
- Other

## **Expected Duration of Project**

Please indicate the number of years for which funding is requested (three years maximum).

## **Budget Summary**

Please supply the budget total for each year requested. (Note: more information on the proposed budget, including detail and justification, is requested below)

## **Keywords**

Please supply important keywords that characterize this project.

## **Project History**

Please indicate if this is a new or continuing project. If a continuing project, indicate when it began, the number of years of activity, and the sources of funding. Also, indicate how this project relates to other past, current, and anticipated future research projects. Summarize previous work in this area (1600 characters).

*Clarification about Progress Reports:* Please be advised that progress reports should not be included as part of your submission. Instead, use the sections entitled "Project History" and "Summary" to briefly discuss any previous work on your project that is relevant to the present proposal.

## **Summary**

Please include a layperson summary of this project (approximately 100 words).

## **Objectives of Proposed Research and Path to Application**

Please state the aim or broad goal of the proposal, followed by a numbered list of specific objectives. After the specific objectives provide a summary of the potential impact and relevance of the proposed research, covering the points indicated below (3,200 characters).

- **Biological Research Proposals:** Describe how the project's findings will lead to practical applications in California winegrape production and describe the steps that must be taken to achieve field application. Provide an estimate of the timeframe involved. Describe how the overall project and each objective address the fundamental goal of solving the Pierce's disease problem in California. For those proposals that present a control strategy nearing the application stage, include a research component intended to estimate the anticipated costs and economic benefits of implementing the control strategy. Cite relevant literature. Describe the project's relevance to the research recommendations provided in Attachment A of this RFP.
- **Economic Research Proposals:** Describe how the research will further the understanding of the economic consequences of PD or the economics of potential PD solutions, and how the research can lead to better solutions to the PD problem. Describe how the overall project and each objective address the fundamental goal of solving the Pierce's disease problem in California. Cite relevant literature. Describe the project's relevance to the research recommendations provided in Attachment A of this RFP.

## **Methodology to Accomplish Objectives**

- **Biological Research Proposals:** Discuss the experimental procedures for each objective. Discuss laboratory experiment or plot design, expected results, statistical analyses, methods to be used, parameters of data collection including sampling methods, and potential pitfalls and limitations. For research that has a field component, discuss site selection and how the field component will help accomplish the stated objectives. Cite relevant literature.
- **Economic Research Proposals:** Explain the approach to be taken and be specific with respect to research methods, data collection, and statistical analysis. Cite relevant literature.

## **Research Timetable**

Please outline the timeline for the research project, indicating start dates, periods of activity, and completion dates for each activity and objective, and for the entire project.

## **Research Capacity and Likelihood of Accomplishing Objectives**

Please summarize how the principal investigators' and cooperators' research capacities (i.e., dedicated financial sources, computer facilities, laboratory and field resources, and human resources) and previous work make the proposed work feasible and increase the likelihood for accomplishing the stated objectives. For field studies, principal investigators should indicate who will maintain the field-site and include a statement describing how the site will be maintained that demonstrates awareness of good farming practices.

### **Intellectual Property**

Please describe any intellectual property, other than copyrighted publications, that this project is likely to produce, and provide information or a URL describing your institution's policies for managing intellectual property. In addition, researchers should make reasonable efforts to describe any proprietary technologies, including methodologies, that your research will necessarily use or incorporate and the steps, if any, that may be required in order to use these proprietary technologies for practical field applications of the project's research results. Researchers should also note that the Public Intellectual Property Resource for Agriculture [www.pipra.org](http://www.pipra.org) is available for consultation on PD/GWSS intellectual property issues. See Attachment B for more information about intellectual property and data sharing.

### **Current, Planned, Pending, and Recent PD/GWSS Research Support**

Please use the following format to identify support for your current, planned, pending, and recent projects that have any component related to the research proposed in your submission.

- Provide information on all current, planned, pending, and recent projects, whether or not there is a specific time commitment by a PI or Co-PI. Where there is a time commitment (with or without a salary provision) indicate the percentage of time on an annual basis. If there are no current, planned, or pending PD-related projects, please state "NONE."
- Explain any connections and/or overlaps between existing and/or pending support and this submitted proposal. How will the total support package tie together? If there is overlap, please provide a short narrative describing what activities overlap and the percentage of effort on the proposed project that is to be devoted to the overlapping activities. If no overlap is expected, please state "NONE."

#### Related current projects

| Name             | Supporting agency & project number | Total budget | Effective & expiration dates | Percent of time committed | Project title |
|------------------|------------------------------------|--------------|------------------------------|---------------------------|---------------|
| (PIs and Co-PIs) |                                    |              |                              |                           |               |
| (PIs and Co-PIs) |                                    |              |                              |                           |               |

#### Related projects that are planned (within the next 6 months) or for which funding is pending, and recent (past 5 years) projects for which funding was received

| Name             | Supporting agency and project number | Total budget | Proposed effective & expiration dates | Percent of time committed | Project title |
|------------------|--------------------------------------|--------------|---------------------------------------|---------------------------|---------------|
| (PIs and Co-PIs) | This proposed project                |              |                                       |                           |               |
| (PIs and Co-PIs) |                                      |              |                                       |                           |               |

### **Biographical Sketches**

Please include a brief biographical sketch for each PI and Co-PI. List up to 15 of his/her most recent publications (not just those relating to the current project). Maximum of two pages per PI or Co-PI, excluding the list of publications.

### **Budget Request**

- Please present the budget request in the format provided below. Do not put amounts in shaded areas. Include a narrative explanation and justification of budget items.
- Indirect costs will not be covered and should not be included.
- CDFA retains the right to claim ownership of any equipment purchased using CDFA funds.
- Services of private subcontractors must be obtained through a competitive bid process.

**Budget request format for submissions to the CDFA PD/GWSS Board**

|   | FY 2013-14           |             | FY 2014-15           |             | FY 2015-16           |             | <b>TOTAL</b> |
|---|----------------------|-------------|----------------------|-------------|----------------------|-------------|--------------|
|   | % of Time on Project | Amount (\$) | % of Time on Project | Amount (\$) | % of Time on Project | Amount (\$) |              |
| Personnel   |                      |             |                      |             |                      |             |              |
| Professional  |                      |             |                      |             |                      |             |              |
| SRA/Tech  |                      |             |                      |             |                      |             |              |
| Lab Assistant   |                      |             |                      |             |                      |             |              |
| Other   |                      |             |                      |             |                      |             |              |
| Employee Benefits   |                      |             |                      |             |                      |             |              |
| <b>SUBTOTAL</b><br>(Personnel + Benefits)                   |                      |             |                      |             |                      |             |              |
| Supplies and Expenses                                       |                      |             |                      |             |                      |             |              |
| Equipment   |                      |             |                      |             |                      |             |              |
| Travel  |                      |             |                      |             |                      |             |              |
| Other   |                      |             |                      |             |                      |             |              |
| Indirect Costs*   |                      |             |                      |             |                      |             |              |
| <b>SUBTOTAL</b><br>(Supplies, Expenses,<br>Equipment, etc.) |                      |             |                      |             |                      |             |              |
| <b>TOTAL</b>  |                      |             |                      |             |                      |             |              |

(\*Indirect costs cannot be covered by CDFA.)

**Literature Cited**

Please include a list of literature cited in the research proposal. Provide complete citations (authors, year published, full title, journal or book title, and inclusive page numbers). Within the proposal, cite references by author and year.

## CDFA PD/GWSS<sup>1</sup> RESEARCH PRIORITIES

(Based on: PD/GWSS Research Scientific Review, Final Report, August 2007, CDFA PD/GWSS Research Scientific Advisory Panel (RSAP); updated for this RFP)

- **Research proposals that address the following key research areas will be given funding priority by the CDFA program. Proposals in other areas relevant to PD/GWSS management will also be considered. All proposals should include an explanation of how the proposed research can lead to reductions in the PD problem and development of a sustainable PD management strategy. The CDFA will take into account the perceived applicability of the anticipated results when making awards.**
- **Information on past and current research is available at <http://www.piercesdisease.org/>. Researchers are encouraged to review this information to ensure proposed research represents new ideas or approaches and does not unproductively overlap with prior efforts.**

### BIOLOGICAL RESEARCH PRIORITIES

**THE CDFA WILL CONSIDER HIGHLY INNOVATIVE RESEARCH PROJECTS THAT ARE TARGETED TOWARDS COMMERCIAL APPLICATION WITHIN 10 YEARS. SOME EXAMPLES OF PRIORITY AREAS ARE PROVIDED BELOW.**

**Exploiting *Xylella fastidiosa* (*Xf*) virulence factors to control Pierce's disease.** Several labs have participated in the effort to knock out *Xf* virulence genes and/or over-express them, followed by testing the mutant strains for virulence on grape. This work has led to several important insights that can potentially be applied to new PD control strategies, including transgenic or non-transgenic means of interfering with the function of virulence factors to confer resistance to *Xf* infection.

Priority areas include, but are not limited to:

- Use of diffusible signal factor (DSF) for disrupting *Xf* colonization, including delivery by plant associated microbes, transgenic rootstocks, and application of chemical analogs.
- Inhibition of *Xf* polygalacturonase (PG). This research area includes identification of polygalacturonase-inhibiting proteins (PGIPs) with high activity against *Xf* PG, delivery of PGIP to grape plant scions from transgenic rootstocks, and development of small molecule inhibitors of *Xf* PG.
- Targeting other *Xf* proteins required for virulence. This research area includes development of protein/peptide-based inhibitors of cell surface proteins such as pilins and adhesins, along with identification of chemical inhibitors of these proteins.
- Demonstration of utility as a control strategy.

**Biological control of GWSS using parasitoids and other agents.** The use of parasitoids to reduce population densities of GWSS continues to show promise, especially in settings where synthetic insecticidal sprays cannot be used (e.g. organic farms, urban areas, or other non crop habitat). The labor-intensive methods required to produce parasitoids are currently a major limitation of this approach. Natural GWSS pathogens (e.g. viruses and fungal pathogens) could also be examined as

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<sup>1</sup> CDFA = California Department of Food and Agriculture; PD = Pierce's disease; GWSS = glassy-winged sharpshooter.



potential biological control agents, and methods developed for their effective application. A related approach could include the identification and potential disruption of GWSS endosymbionts.

Priority areas include, but are not limited to:

- Elucidation of biochemical cues that parasitoids utilize to identify and parasitize their hosts.
- Production of parasitoids, with a particular emphasis on developing efficient means of mass producing GWSS eggs or an alternative suitable host for large-scale production of parasitoids.
- The utility of natural enemies (with an emphasis on native and introduced parasitoids) to suppress PD should be measured, particularly with respect to impact on GWSS populations in the field and under diverse environmental conditions (cultural practices and climatic differences). Further work should be conducted to quantify the value of natural enemies as an integral component of PD disease control programs in urban and rural communities. The evaluation of new, imported species of parasitoids should focus on realistic assessments of their potential for greater impacts on PD than from currently established natural enemies (such as with the aid of models). Potential agents hypothesized to be more effective early in the season and suited to the California climate should be a priority. The potential impact of imported parasitoids on native non-pest leafhoppers should be assessed before release is allowed, using realistic host specificity trials.
- Research on the conservation of existing parasitoids and managing the environment to increase their effectiveness (e.g. with understory plantings that provide key resources such as plant nectarines as supplemental food sources, over-wintering sites, etc.). This could include artificial feeding of parasitoids. There is a significant body of work relating to conservation of natural enemies and increasing their numbers and activity in agricultural crops with carefully selected cover crops. Such studies as they pertain to PD/GWSS should be pursued.

**The relevance of *Xf* genotype to disease control.** Targeted comparative analysis with a focus on genes that are important in current promising strategies for control, such as the *rpf*, polygalacturonase, and pilin- and adhesion-encoding genes. The goal is to assess the potential impact of genotypic diversity on proposed control strategies.

**Plant-GWSS interactions: Determinants of host specificity.** An understudied area is what makes host plants good and/or attractive hosts versus poor and/or unattractive hosts for GWSS. Do poor hosts chemically repel GWSS? Are there aspects of plant physiology that can be manipulated or compounds that can be generated *in planta* to prevent GWSS feeding and/or reproduction? Can host plant physiology be manipulated to reduce GWSS attraction and/or growth?

Priority areas include, but are not limited to:

- Determine the mechanisms by which GWSS locates its plant hosts. The chemical ecology of GWSS-grapevine interactions/relationships should be examined (e.g., plant host factors that influence their attractiveness to females for oviposition and egg maturation).
- Identification of GWSS repellents.
- Identification of factors that reduce GWSS attraction and/or fitness that can be delivered through host xylem: for example, novel compounds, sublethal effects of pesticides (particularly the new generation systemic pesticides),

**Plant-mediated disruption of GWSS life cycle or *Xf* transmission.** There is precedence in studies of plant pathogenic nematodes and fungi for the notion that RNAs produced by the host and ingested by the parasite can silence specific corresponding parasite genes and prevent disease. Recent

scientific articles [Huang (2006), Nowara (2010) and Tinoco (2010)] demonstrate potential utility of RNAi-mediated silencing of pathogen genes.

Priority areas include, but are not limited to:

- Developing an efficient transient expression system to study effects of individual RNAi constructs targeting GWSS in a high-throughput manner.
- Developing high-throughput screening of candidate genes. Examine the utility of genes identified as essential in related species (e.g. aphids and psyllids).
- Determining the targets/factors affected by RNAi. More specifically, identification of candidate targets for silencing, including GWSS genes important in *Xf* transmission, and GWSS genes required for maturation and reproduction. Assessment of the ability of plant-produced double-stranded RNAs to silence GWSS genes.
- Determining the sensitivity/specificity of the methodology.
- Development of a delivery system—RNAi delivery to the right location (within the insect) for *control*.
- Assessing the commercial viability (scalability) of this technology.

**Host resistance to Pierce's disease.** In annual crop species, the most cost-effective and environmentally safe method for preventing disease is breeding for resistance. Traditional breeding strategies can be dramatically accelerated if the genes controlling resistance have been linked with DNA-based molecular markers that can be scored in a high throughput fashion. A second area that merits more attention in the short-term is collection and dissemination of information on PD resistance in existing commercial varieties of grapes. There appears to be significant anecdotal information about which commercial grape varieties are most susceptible to PD, but it does not appear that any one has performed a carefully controlled study of commercial grape varieties and disseminated the results. Several chemical and biotic inducers of systemic plant resistance have been applied with limited success in a few crops. Existing commercial varieties of grapes should also be screened for effective responses to such inducers.

Priority areas include, but are not limited to:

- Marker Assisted Selection-based breeding for resistance. The RSAP recommends recruitment of additional breeders so that genes in addition to PdR1 can be mapped, tagged with molecular markers, and the process of introgression into multiple commercial backgrounds initiated.
- Assessment of PD resistance in existing commercial grape varieties. The RSAP envisions greenhouse studies employing both GWSS-mediated inoculations in one set of experiments and mechanical inoculations in another set, to distinguish between resistance derived from reduced attractiveness to the vector versus reduced susceptibility to colonization by the bacterium. Data on both PD symptoms and *Xf* growth should be obtained to distinguish also between tolerance and resistance, as tolerant varieties could become problematic reservoirs of the pathogen.
- Additional germplasm screening of non-commercial grape varieties and wild relatives to identify additional mechanisms of resistance.
- Assessment of PD resistance in existing commercial grape varieties following treatment with chemical or biotic inducers of resistance. Given the limited success of inducers in other crops,

a proposal in this area should include substantial preliminary data on the effectiveness of one or more agents.

- Proteomic/metabolic and gene expression studies to determine the basis of resistance/susceptibility in grape germplasm.

### ECONOMIC RESEARCH PRIORITIES

**Economic analysis of the impact of PD/GWSS on agriculture, both in terms of real and potential economic effects and economic losses due to PD and the effects of current and prospective control measures, including losses to growers and other market participants.**

Priority areas include, but are not limited to:

- Modeling and measuring the economic effects of the current PD/GWSS disease situation. How has PD/GWSS affected costs, acreages, prices and quantities? How much cost has been incurred so far and who has incurred those costs among consumers, producers, taxpayers, and other stakeholders by crop?
- What are the impacts on disease control and economic effects of alternative government and industry-wide policies for dealing with PD/GWSS? What policies complement alternative research and development strategies?
- Simulating alternative *ex ante* scenarios of the economic effects if PD/GWSS were to continue unabated. What are the likely impacts on costs, acreages, prices and quantities? How much cost is likely to be incurred, who is likely to incur those costs among consumers, producers, taxpayers, and other stakeholders by crop?
- Evaluating, in an *ex ante* sense using simulation models, the likely contributions of alternative investments in PD/GWSS research and development. Such a project could evaluate the potential contributions of several alternative R&D efforts that have different impacts on control of PD/GWSS and different time horizons. Such a project would not attempt to evaluate the likely scientific merit of alternative research efforts, but rather assess the payoff for the industry, including consumers, if reasonable success is obtained.

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Huang, G., Allen, R., Davis, E.L., Baum, T.J., and Hussey, R.S. (2006). Engineering broad root-knot resistance in transgenic plants by RNAi silencing of a conserved and essential root-knot nematode parasitism gene. *Proceedings of the National Academy of Sciences* 103, 14302-14306.

Nowara, D., Gay, A., Lacomme, C., Shaw, J., Ridout, C., Douchkov, D., Hensel, G., Kumlehn, J., and Schweizer, P., (2010). HIGS: Host-Induced Gene Silencing in the obligate Biotrophic Fungal Pathogen *Blumeria graminis*. *The Plant Cell*, (in press—advanced publication online at [dx.doi.org/10.1105/tpc.100.077040](https://doi.org/10.1105/tpc.100.077040)).

Tinoco, M., Dias, B., Dall'Asta, R., Pamphile, J., and Aragao, F. (2010). *In vivo* trans-specific gene silencing in fungal cells by *in planta* expression of a double-stranded RNA. *BMC Biol.* 8, 27.

## INTELLECTUAL PROPERTY, DATA SHARING, AND PROGRESS REPORTS

### **Intellectual Property and Data Sharing**

(From: Plant Genome Research Program RFA for FY 2007, Program Solicitation NSF 07-531, National Science Foundation)

Describe the management of intellectual property rights related to the proposed project, including plans for sharing data, information, and materials resulting from the award. This plan must be specific about the nature of the results to be shared, the timing and means of release, and any constraints on release. The proposed plan must take into consideration the following conditions where applicable:

-- Sequences resulting from high-throughput large-scale sequencing projects (low pass whole genome sequencing, BAC end sequencing, ESTs, full-length cDNA sequencing, etc.) must be released according to the currently accepted community standard (e.g. Bermuda/Ft. Lauderdale agreement) to public databases (GenBank if applicable), as soon as they are assembled and the quality checked against a stated, pre-determined quality standard.

-- Proposals that would develop genome-scale expression data through approaches such as microarrays should meet community standards for these data [for example, Minimum Information About a Microarray Experiment (MIAME) standards; see <http://www.mged.org/Workgroups/MIAME/miame.html>]. The community databases (e.g. Gene Expression Omnibus) into which the data would be deposited, in addition to any project database(s) should be indicated.

-- If the proposed project would produce community resources (e.g. epidemiological data, genotyping data, biological materials, software, etc.), these resources should be made available to the research community in a timely fashion. The timing of release should be stated clearly in the proposal, and how the resources will be disseminated and stored should be described. The resources produced must be available to all segments of the scientific community, including industry. A reasonable charge is permissible, but the fee structure must be outlined clearly in the proposal. If accessibility differs between industry and the academic community, the differences must be clearly spelled out.

The Bermuda / Ft. Lauderdale agreements can be found online at [http://www.ornl.gov/sci/techresources/Human\\_Genome/research/bermuda.shtml](http://www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml) and <http://www.genome.gov/Pages/Research/WellcomeReport0303.pdf>.

### **Progress Reports**

Funded researchers will be required to submit project information, including progress reports, publications, and links to project-related sequence data, onto the following website: <http://www.piercesdisease.org/>.

## REPORTING REQUIREMENTS FOR CDFA PD/GWSS RESEARCH AGREEMENTS

As indicated in the annual Request for Proposals (RFP), periodic progress reports and a final report are required for each funded project. The reports are used to communicate research activities, progress, and findings, and to document that the terms of the agreement are being fulfilled. Provided below is information about the reports.

1. Three reports are required per year (due approximately every 4 months).
2. Progress Reports are required while the agreement is still in effect. Their purpose is to report the progress made on the project. Once the agreement has ended, it is no longer necessary to submit Progress Reports. Instead, a Final Report becomes due for the agreement.

There are three types of Progress Reports, as follows:

- a. Interim Progress Reports – These provide information on the research progress made since the previous progress report for that agreement, or further back if the researcher chooses. The requirements for these reports are provided below. These reports are submitted by the researcher to a website constructed for this purpose. They are usually due in March and July.
  - b. Renewal Progress Reports – These are required for projects having multi-year agreements, and are used to determine if the project should be continued into the next fiscal year of the agreement. The requirements for these reports are provided below. These reports are submitted by the researcher to a website constructed for this purpose. They are usually due in March and satisfy the requirement to submit an Interim Progress Report at that time.
  - c. Symposium Proceedings Reports – The formatting and content guidelines for these reports are provided to researchers each year. These reports are emailed to CDFA's Pierce's Disease Control Program and are published in the Proceedings of the annual Pierce's Disease Research Symposium. They are also made available on the internet. They are usually due in October.
3. A Final Report is due at the end of the agreement. The Final Report is a comprehensive, stand-alone report that covers the activities and findings for the entire agreement period. It is due within 30 days of the end of the agreement.
  4. Payment of invoices is held up if required reports are not submitted.

### Guidelines for Interim Progress Reports

- Title of report (that is, "Interim Progress Report for CDFA Agreement Number \_\_\_\_\_.")
- Title of project. (Please use the same title as was used for the approved research proposal.)
- Principal investigators, Co-PIs, cooperators, etc., and their affiliations.
- Time period covered by the report.
- Introduction.
- List of objectives. (Please use the same list of objectives as was used in the approved research proposal).
- Description of activities conducted to accomplish each objective, and summary of accomplishments and results for each objective.
  - Please use each objective as a heading in your report, under which you discuss the progress and results for that objective.
  - For field trials, please include information on the status of the field trial, including planting and sampling activities, the condition of the plants, and any factors impacting the progress of the field trial. Also, please include photos of the field planting.
- Publications produced and pending, and presentations made that relate to the funded project.
- Research relevance statement, indicating how this research will contribute towards finding solutions to Pierce's disease in California.
- Layperson summary of project accomplishments.
- Status of funds.

- Summary and status of intellectual property associated with the project.
- Literature cited.
- Please submit the report online at <http://www.piercesdisease.org/>. Click on “Researcher Login” and follow the instructions. Questions about the website or uploading your report can be emailed to [questions@piercesdisease.org](mailto:questions@piercesdisease.org)

### **Guidelines for Renewal Progress Reports**

- Title of report (that is, "Renewal Progress Report for CDFA Agreement Number \_\_\_\_\_.")
- Title of project. (Please use the same title as was used for the approved research proposal.)
- Principal investigators, Co-PIs, cooperators, etc., and their affiliations.
- Time period covered by the report.
- Introduction.
- List of objectives. (Please use the same list of objectives as was used in the approved research proposal).
- Description of activities conducted to accomplish each objective, and summary of accomplishments and results for each objective.
  - Please use each objective as a heading in your report, under which you discuss the progress and results for that objective.
  - For field trials, please include information on the status of the field trial, including planting and sampling activities, the condition of the plants, and any factors impacting the progress of the field trial. Also, please include photos of the field planting.
- Publications produced and pending, and presentations made that relate to the funded project.
- Research relevance statement, indicating how this research will contribute towards finding solutions to Pierce’s disease in California.
- Layperson summary of project accomplishments.
- Status of funds.
- Summary and status of intellectual property associated with the project.
- Literature cited.
- Please submit the report online at <http://www.piercesdisease.org/>. Click on “Researcher Login” and follow the instructions. Questions about the website or uploading your report can be emailed to [questions@piercesdisease.org](mailto:questions@piercesdisease.org)

### **Guidelines for Final Reports**

- Final reports should be comprehensive and stand-alone (i.e., cover the entire agreement period, and not require going back and reading earlier progress reports to find out the main activities and findings from the project).
- Title of report (that is, "Final Report for CDFA Agreement Number \_\_\_\_\_.")
- Title of project. (Please use the same title as was used for the approved research proposal.)
- Principal investigators, Co-PIs, cooperators, etc., and their affiliations.
- Time period covered by the report. This should be the entire agreement period.
- Introduction.
- List of objectives. (Please use the same list of objectives as was used in the approved research proposal).
- Description of activities conducted to accomplish each objective, and summary of accomplishments and results for each objective.
  - Please use each objective as a heading in your report, under which you discuss the progress and results for that objective.
  - For field trials, please include information on the status of the field trial, including planting and sampling activities, the condition of the plants, and any factors impacting the progress of the field trial. Also, please include photos of the field planting.
- Publications produced and pending, and presentations made that relate to the funded project.

## Attachment C

- Research relevance statement, indicating how this research will contribute towards finding solutions to Pierce's disease in California.
- Layperson summary of project accomplishments.
- Status of funds.
- Summary and status of intellectual property associated with the project.
- Literature cited.
- Please submit the report online at <http://www.piercesdisease.org/>. Click on "Researcher Login" and follow the instructions. Questions about the website or uploading your report can be emailed to [questions@piercesdisease.org](mailto:questions@piercesdisease.org)

### Questions?

- Contact the CDFA Pierce's Disease Control Program at 916-900-5024 or [pdresearch@cdfa.ca.gov](mailto:pdresearch@cdfa.ca.gov).