Consortium on Law and Values in Health, Environment & the Life Sciences

2015-16 Student Proposal Cover Page

Applicant Information			
Applicant name:	**Ana Heck**	Email:	**heckx046@umn.edu**
Project title:	**Healthy Honey Bees and Communities: Implementation Recommendations for Community Apiaries in Urban Neighborhoods**		
Department:		College:	
Degree program:	**Masters of Public Policy**	Faculty advisor name & email:	**Professor Deborah Levison, dlevison@umn.edu** ☐ NA
Dept. Head:	**Associate Dean Laura Bloomberg**	Dept. Head's email:	**bloom004@umn.edu**
Dean: **Dean Eric Schwartz**		Dean's email: **eschwart@umn.edu**	

How did you hear about this funding opportunity?
☒ Consortium e-mail ☐ The Brief ☐ Advisor ☐ Dept. email/newsletter ☐ OVPR website ☐ Other

Funding	
Total amount of funding requested:	**$**

Executive summary (maximum 200 words)

Like community gardens, community apiaries offer opportunities for people without suitable land to interact with nature and learn about agricultural systems and food security. The City of St. Paul is investigating the implementation of a community apiary where community members would be able to maintain and manage their own beehives. While this project offers great opportunities, issues related to honey bee health and nutrition pose major concerns. Community apiaries are rare, and research on the topic is scarce. In this interdisciplinary study, I will study the benefits and challenges that a community apiary in St. Paul would pose to community groups and honey bees. I will begin by conducting a literature review of studies and policies related to community apiaries and urban beekeeping. Next, I will investigate best practices for maintaining healthy honey bees by collecting data from 2 colonies managed on park property in St. Paul. I will also interview community members, the City of St. Paul, honey bee experts, and other potential stakeholders. This research project is intended to provide the City of St. Paul and similar cities with recommendations for successful implementation of sustainable, community apiaries in economically and culturally diverse neighborhoods.

Approvals

Check all appropriate approvals required for your proposal. Approvals must be obtained prior to receipt of funding. If you have applied for approval but have not yet received it, indicate that below.

IRB	☐ Yes ☐ No ☐ NA	☒ Application pending	Will apply Spring 2015
Other	☐ Yes ☐ No ☐ NA	☐ Application pending	Specify:

Checklist

☒ The proposal is 1000 words or less excluding budget, biographies, references and citations.

☒ The proposal includes a work plan with a specific timeline using months or quarters to identify work to be done and completion dates.

☒ The proposal includes a 1-2 paragraph biography of the applicant and all co-investigators.

☒ The budget form is complete including the funds sought for this project, other pending applications for this project, and the amount/source of matching or other funds.

☒ The applicant's faculty advisor is copied on the application email. Professional students w/o advisors check NA.

☒ All necessary approvals are pending or received.

Healthy Honey Bees and Communities: Implementation Recommendations for Community Apiaries in Urban Neighborhoods

Background and Significance

Bees are vital to our food system, with more than a third of the world's crops and nearly half of the leading global food commodities depending on bees for pollination (Spivak et al., 2011 and vanEnglesdorp et al. 2010). Concernedly, honey bee colonies are in great decline in the United States. While urban bee colonies might not provide pollination services for crops, they often provide the missing link in food-sustainability education and serve as a powerful tool for making connections between lifestyle, landscape, and our own health and wellbeing.

Economically diverse communities face barriers to managing honey bee colonies. Since these colonies require suitable land, people who do not own property are often unable to own beehives. The City of St. Paul, Minnesota is investigating the implementation of a community apiary in several of its economically and culturally diverse locations across the city. A community apiary is a space where multiple community members are able to manage their honey bee colonies, much like a community garden provides plots for growing food. While this apiary would provide opportunities for beekeepers and community members to learn about honey bee health and food systems, there is a dearth of academic research on the best practices of such a program. Research is needed to examine how the implementation of a community apiary can be ethical, sustainable, and culturally aware.

Additionally, research is needed to examine management techniques that would promote honey bee health in the context of a community apiary. Honey bee diseases and pests spread among colonies that are in close proximity to each other, as would be the case in a community apiary. Colonies with significant infestation with mites can die within 6 months to 2 years, and much sooner if they are infected with diseases (Gherman et al., 2014 and Spivak et al., 2011). A mismanaged community apiary without disease and pest control protocols would potentially be harmful to a community's honey bee population. Since these protocols are not widely (if at all) available for communities to model, their development would contribute greatly to future community apiary projects nationwide.

Recommendations are also needed to address horticultural practices in areas surrounding community apiaries. Honey bees can forage on 100 different plant species in a single geographic area (Garbuzov et al., 2014). Since some flowers and plants provide better nutrition for honey bees than others, it is important to examine which flowers are best suited to provide pollen and nectar for honey bees in the St. Paul area (Matteson et al., 2013 and Carter et al., 2006). Management of urban landscapes must also be studied, as commonly used insecticides such as pyrethroids and neonicotinoids have been shown to have detrimental effects on the health of honey bees (Spivak et al. 2011). Finally, it is important to investigate the number of honey bee colonies that can be supported by urban landscapes in St. Paul. A community apiary could be harmful to other pollinators if there were competition for nutritional resources from flowers.

Research Questions and Methods

1) What management techniques best promote the health and ethical treatment of managed, urban honey bee colonies?
2) What are realistic and effective ways to collect data on honey bee health from a community apiary?
3) What practices and policies will lead to the successful and respectful implementation of a community apiary in St. Paul?

The first part of my research will involve investigating factors that affect honey bee health in urban areas. I will review literature and other sources to study the effects of landscapes, diseases, mites, and pesticides on honey bees in urban areas. Since honey bee health and management depends largely on geographic location, I will focus my research on northern climates.

The second part of my research will involve managing 2 honey bee colonies in St. Paul, Minnesota in cooperation with city officials. Since urban beekeeping is dependent on geographic location, it is important to study how these colonies respond to their environment. It is also necessary to investigate how best to collect health data from these colonies.

The third part of my research will involve interviews and focus groups with community members, city officials, honey bee experts, and beekeepers from Minnesota Hobby Beekeeping Association. Since I will be collaborating with the City of Saint Paul and community members, this part of my research is intended to be participatory and open. I will conduct interviews and focus groups to investigate the community's interests and concerns regarding a community apiary.

Work Plan and Timeline

May-June 2015	- Conduct academic research on honey bee health in managed, urban areas - Research benefits and challenges of already existing community apiaries
July-August 2015	- Begin managing 2 honey bee colonies in cooperation with the City of St. Paul to collect honey bee health data (to be continued throughout the summer). - Conduct interviews with community members, honey bee experts, and project stakeholders
September 2015	- Complete drafts of academic research findings and policy recommendations
October 2015-May 2016	- Complete final academic research paper to submit for publication - Complete policy recommendations for the City of St. Paul, Minnesota - Overwinter 2 honey bee colonies in St. Paul, Minnesota - Prepare report to be submitted to Consortium by July 31, 2016

Innovation and Contribution

While there is a significant amount of research on honey bee health, academic research on community apiaries is scarce, and perhaps non-existent.[1] Interdisciplinary, academic research on community apiaries will contribute to the fields of entomology and public policy.

This project's potential impact in furthering work on societal implications of the life sciences is great because a community apiary in St. Paul could be used as a model for cities and communities around the world. The research for this project is essential for implementing a successful and sustainable community apiary and for providing a basis for future academic research on community and urban apiaries.

[1] A search of "community apiary" and "community apiaries" in the MNCAT Discovery database produces 0 results.

Biographies

Principal Investigator: Ana Heck

Ana Heck is a Masters of Public Policy student at the University of Minnesota interested in the intersection between beekeeping, policy, and community engagement. Ana learned how to keep bees in Nicaragua while working on an organic farm that managed about 140 honey bee colonies. While in Nicaragua, she also worked with a beekeeping cooperative whose mission was to provide economic and leadership opportunities for women. Ana began working with the University of Minnesota's Bee Squad in 2014. She is currently in a Horticulture course instructed by Professors Marla Spivak and Eric Watkins called Pollinator Protection in Managed Landscapes, which examines issues and policies that affect the health of bees and other pollinators. She is a Spring 2015 Graduate Research Assistant and Cedar Riverside Fellow.

Ana also has experience with community engagement and outreach with economically and culturally diverse neighborhoods through her work in Nicaragua at the Creighton Center for Service and Justice. She holds a B.A. in Philosophy and Spanish with minors in Applied Ethics and Justice & Peace Studies from Creighton University.

Co- Investigator: Rebecca Masterman

Rebecca Masterman, Ph.D., is the Associate Director of the University of Minnesota Bee Squad. The Bee Squad's mission is to assist the public and beekeepers in supporting bee health by developing programming that integrates research, sustainability, outreach, environmental health, community and art. Using this approach, the Bee Squad aims to utilize unique, interdisciplinary and cooperative efforts to help all bees. Rebecca has experience navigating local beekeeping ordinances and policies and overseeing the Bee Squad's management of over 150 honey bee colonies in the Twin Cities metro area.

Rebecca earned her doctoral degree from the University of Minnesota in Entomology. Advised by Dr. Marla Spivak, her dissertation was "Neuroethology of honey bee (*Apis mellifera*) hygienic behavior" (2000). She will support the project by advising on issues related to honey bee health, mites, and diseases.

Co-Investigator: Faith Krogstad

Faith Krogstad, Environmental Education Coordinator at the City of Saint Paul, has over sixteen years of experience in environmental education, youth work, and outdoor recreation leadership and has worked for the City of Saint Paul since 2013. In her role as Environmental Education Coordinator, Faith engages youth, adults, and families in Saint Paul's regional parks, connecting urban audiences to nature and environmental issues through citizen science, teacher professional development, interpretation, art, and outdoor recreation. Faith holds a Master of Arts in Education from the University of Minnesota, a Graduate Certificate in Community & Environmental Education from the University of Washington, and a Bachelor of Arts in Biology from Macalester College. Faith has enjoyed participating in a community garden, raising chickens, and assisting with beekeeping in Saint Paul.

Budget Justification for Supply & Services

Category/Purpose	Item	Quantity	Price Per Unit	Total Costs
Undergraduate Graduate Research Assistant	Pay: $12/hour, 2 hours/week, 14 weeks	1	$336.00	$336.00
Focus Groups and Interviews	Refreshments	15	$10.00	$150.00
SUPPLY & SERVICES TOTAL				$486.00

Since the best practices of bee keeping require at least two beekeepers, an undergraduate research assistant will assist with beekeeping, logistics, and colony health collection data. Refreshments will be purchased for focus groups and interviews.

Budget Justification for Equipment

Category/Purpose	Item	Quantity	Price Per Unit	Total Costs
Beehive Equipment	Bottom Board with Entrance Reducer	2	$14.95	$29.90
Beehive Equipment	Deep Hive Body, Assembled, with Frames and Foundation	6	$65.00	$390.00
Beehive Equipment	Medium Honey Super, Assembled, with Frames and Foundation	4	$54.00	$216.00
Beehive Equipment	Telescoping Cover with Inner Cover	2	$29.00	$58.00
Beehive Equipment	Metal Bound Queen Excluder	2	$6.95	$13.90
Honey Bees	Packages 2lb of Bees with Mated Queens	2	$110.00	$220.00
Beekeeping Equipment	4x7 Stainless Smoker with Guard	1	$37.95	$37.95
Beekeeping Equipment	Hive Tool	4	$6.95	$27.80
Beekeeping Equipment	Bee Suit with Hooded Veil	4	$79.95	$319.80
Beekeeping Equipment	Feeder Pail	4	$4.95	$19.80
Beekeeping Equipment	Bee Brush	1	$4.95	$4.95
Beekeeping Equipment	Moisture Board	2	$6.95	$13.90
Beehive Equipment	Winter Covers	2	$9.95	$19.90
Beekeeping Treatment & Management	Organic Mite Treatment	2	$12.00	$24.00
Beekeeping Treatment & Management	Pollen Patty	6	$3.00	$18.00
Beekeeping Treatment & Management	Sugar For Feeding	2	$40.00	$80.00
Honey Extraction	1 Hour at Beez Kneez + Hot Room Rental	1	$57.00	$57.00
EQUIPMENT TOTAL				**$1,550.90**

Since beekeeping is largely dependent on geographic location, it is important to investigate the health of 2 honey bee colonies for 1 year in St. Paul in order to give recommendations for the implementation of a community apiary. Staff from the City of St. Paul will participate in beekeeping management to understand some of the implications of keeping bees in St. Paul, and will contribute their insight to the policy implementation recommendations.

All equipment will be used to manage 2 honey bee colonies for 1 year. If the City of St. Paul develops a community apiary for the Summer 2016, all remaining equipment and bees will be given to the City of St. Paul's community apiary. In the case that the City of St. Paul does not begin a community apiary, the colonies will be donated to the University of Minnesota's Bee Lab for continued research.

References

Gherman, B. I., Denner, A., Bobiş, O., Dezmirean, D. S., Mărghitaş, L. a., Schlüns, H., Erler, S. (2014). Pathogen-associated self-medication behavior in the honeybee Apis mellifera. *Behavioral Ecology and Sociobiology*, 1777–1784. doi:10.1007/s00265-014-1786-8

Carter, C., Shafir, S., Yehonatan, L., Palmer, R. G., & Thornburg, R. (2006). A novel role for proline in plant floral nectars. *Naturwissenschaften*, *93*, 72–79. doi:10.1007/s00114-005-0062-1

Garbuzov, M., & Ratnieks, F. L. W. (2014). Listmania: The Strengths and Weaknesses of Lists of Garden Plants to Help Pollinators. *BioScience*, *64*(11), 1019–1026. doi:10.1093/biosci/biu150

Matteson, K. C., Grace, J. B., & Minor, E. S. (2013). Direct and indirect effects of land use on floral resources and flower-visiting insects across an urban landscape. *Oikos*, *122*(June 2012), 682–694. doi:10.1111/j.1600-0706.2012.20229.x

Spivak, M., Mader, E., Vaughan, M., & Euliss, N. H. (2011). The plight of the bees. *Environmental Science and Technology*, *45*(1), 34–38. doi:10.1021/es101468w

vanEngelsdorp, D., & Meixner, M. D. (2010). A historical review of managed honey bee populations in Europe and the United States and the factors that may affect them. *Journal of Invertebrate Pathology*, *103*(2010), S80–S95. doi:10.1016/j.jip.2009.06.011

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Budget for Student Proposals

Project Title: **Healthy Honey Bees and Communities: Implementation Recommendations for Community Apiaries in Urban Neighborhoods**

Instructions: Provide justification along with costs.

			Requested funding	Matching/other funding	
	Category	**Description & justification**	**Amount**	**Amount**	**Source**
1	Your stipend	Salary: 16 hours per week for 17 weeks at the rate of $17.77 per hour, based on the rate of research assistantship positions at the Humphrey School of Pubilc Affairs, to be completed Summer and early Fall 2015.	$4,833	$0	
2	Speaker honoraria	___ speakers x $ _____ honorarium	$0	$0	
3	Supplies & Services	Please see body of proposal for description & justification	$486	$0	
4	Equipment	Please see body of proposal for description & justification	$1,551	$0	
5	Travel	Mileage reimburesement based on University of Minnesota rate of 57.5 cents per mile for 200 miles of driving in personal vehicle for meetings with stakeholders, experts, and community members.	$115	$0	
		Subtotal research expenses (2-6)	**$2,152**	**$0**	
	TOTAL BUDGET		$6,985	$0	

Budget Guidelines

1. Stipend justification. You must justify the amount of stipend you are requesting by identifying the number of hours you plan to work on the project and the hourly wage used for research assistants in your department. Include fringe benefits.

2. For colloquia, identify the number of speakers and the amount of honoraria you will provide.

3. Supplies and services. List out all supplies and their estimated costs. Explain in line 7 or in the body of your proposal what the supplies will be used for.

4. Equipment costs are allowable only if the justification clearly shows that the equipment is necessary for the project. Include explanation of what will happen to equipment at completion of project.

5. Travel costs must include a description of the purpose of the travel, start and stop dates of travel, transportation costs, housing costs, and allowable per diem (use University rates found at http:// travel/umn.edu).