

# **Community Involvement in Research**

## **Monitoring Pollinator Populations using Public Participation in Scientific Research**

### **Overview**

Public Participation in Scientific Research (PPSR) is a concept adopted by many scientific organizations to encourage community involvement with research through observational data collection. Community members will often aid scientists or research facilitators with assessing things like whether bird populations are changing, waterways are being polluted or specific plants promote pollinator activity. Examples include making visual observations, taking measurements, sampling, and performing simple computations.

In this activity, volunteers without specific prior scientific training observe the diverse pollinator species located in and around a farm. Pollinators are an important part of the farm ecosystem. They transport pollen from one flower to another. This process, called “pollination” is essential to the development of many crops such as almonds and melons and many other vegetables and fruits. The following resource references have been included for additional information on PPSR and pollinators.

### **Resource References**

California Pollinator Project: Citizen Scientist Pollinator Monitoring Guide. Xerces Society for Invertebrate Conservation  
[http://www.xerces.org/wp-content/uploads/2010/06/CA\\_CSM\\_guide.pdf](http://www.xerces.org/wp-content/uploads/2010/06/CA_CSM_guide.pdf)

California Pollinator Project: Citizen Scientist Monitoring Pocket Guide. Xerces Society for Invertebrate Conservation  
[http://www.xerces.org/wp-content/uploads/2010/06/CA\\_CSM\\_pocket\\_guide.pdf](http://www.xerces.org/wp-content/uploads/2010/06/CA_CSM_pocket_guide.pdf)

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### **Introduction**

Public Participation in Scientific Research (PPSR) projects often allow scientists to accomplish research objectives more easily, effectively or efficiently than would otherwise be possible. This is due to the fact that scientists can work with willing volunteers, who are not necessarily highly trained scientists, who gather large amounts of data by making observations, measurements, and basic computations. In addition, these projects aim to promote public engagement with science and the specific research that is being conducted by the scientists.

The purpose of this activity is to observe pollinator activity on the farm. Since most of the techniques needed for these observations are easy to learn, the activity does not require a lot of time for training and is fairly quick to execute. Participants will observe the different insects and other animals they see aiding with the pollination of plants. These include various bees, flies, butterflies and hummingbirds. Participants will also note what plants attract the most pollinators, which will be useful information to create more pollinator-friendly habitats on farms.

### **To Lead This Activity You Need to Know**

Facilitators of this activity need to have basic understanding of the following concepts in order to effectively lead students through this activity:

- Pollination types (e.g., self, wind, insect, bird)
- Pollinators (common types)
- Native bees and honey bees
- Flower and plant biology (including reproduction)

### **Key Concepts**

- PPSR: its use and benefits
- Pollination and pollinators
- Plant parts
- Some plants attract more and/or more diverse types of pollinators than others

### **Objectives**

- Learn about PPSR
- Monitor and count pollinators
- Note abundance of different pollinator types
- Note relative attractiveness of different plants to pollinators

## Materials

- Farm with a diversity of plant life
- Pollinator Monitoring Datasheet (one for every two students)
- Clipboard with pencil (one for every two students)
- California Citizen Scientist Bee Monitoring Pocket Guide (one for every two students. (See Resource References section for link)
- Tape measurers, at least 10 feet long or 10 foot long pieces of string (one for each group)

## Activity (45-50 minutes)

1. After welcoming the students to the farm or garden and describing it briefly, tell them that the focus of today's visit is going to be learning about public participation in scientific research. Discuss the following talking points:
  - Public Participation in Scientific Research (PPSR) is a concept adopted by many scientific organizations to encourage community involvement with research through observational data collection.
  - Ask the students why scientific organizations might work with the public to collect data (to decrease the cost of field monitoring which can be very expensive; to get a larger sample size; to encourage community involvement in science).
  - Discuss some disadvantages to having the public collect data (very hard to train people; quality of data can vary and be hard to control).
2. Explain that we're going to be scientists collecting data on pollinators. Discuss the following:
  - What is pollination?
  - Describe the different ways plants are pollinated (i.e. wind, self, animal). Ask them to list some of the most common pollinating insects (e.g., honey bees, other bees, flies, wasps, moths, butterflies).
  - Tell them that the most common agricultural pollinators are honey bees and that over 25% of what we eat is dependant on honey bee pollination.
3. Break the students into groups of two. Give each group one clipboard, one pencil, two data sheets (one for each group member), a measuring tape, and a pocket-monitoring guide.
4. Tour the groups around the farm pointing out crops that require insects for pollination (e.g., squash, watermelon, peach, almond). Point out crops that don't require insects for pollination (e.g., corn, peppers, walnuts). Lead groups to a sight abundant with flowers. This may be an area inside a field or on a field margin. Have the students observe the plants and pollinators. Reassure them that the insects will not hurt them. Honeybees and other insect are not aggressive when they are foraging for nectar and pollen. See if the students can describe some physical characteristics of each pollinator (size, color, striped, antenna length, etc.). Using the pocket guide, have the students identify a few pollinators. Make sure the students can tell the difference between different types of insects and related animals (honey bees, other bees, flies, wasps, moths/butterflies, ants, and spiders).

5. Have each group identify an initial observer and data recorder. Explain that they will switch roles and data sheets after 10 minutes (each student will have an opportunity to be both observer and data recorder). Have the first data recorder fill out the appropriate top sections of data sheet while the observer measures 10 linear feet along a row or field margin. Both observer and data recorder need to pace themselves so that they cover the study 10 ft distance in 10 minutes. Explain to them that they need to be as consistent as possible which will allow for more reliable data.
6. Explain that while making observations:
  - Only record data on animals visiting the reproductive parts of flowers (stamens and/or pistils) Do not record data animals that are only visiting other plant parts (e.g., leaves, stems, or even just the flower petals) or visitors just flying around the general area.
  - Be careful not to disturb insects visiting flowers before you get a chance to observe them. Avoid moving fast, making sudden movements or talking loudly. Walk so that your shadow isn't cast on the area you're trying to observe.
7. Have groups begin collecting data. After 10 minutes have observers and data recorders switch. Have the second data recorders fill out the appropriate top sections of the data sheet while the observer measures 10 linear feet along a row or field margin. Have groups collect data for a second 10-minute period.

### **Discussion and Reflection** (10-15 minutes)

Once finished, have the groups reassemble into one large group.

1. Have each group give a report summarizing their data.
2. As the larger group, discuss some of the following questions:
  - What are their thoughts on the activity?
  - Was it hard to collect data?
  - Do they think they would get better at it with more practice?
  - Do they think their data is accurate?
  - What did they learned about being a citizen scientist?
  - What did they enjoy about the experience?
  - What did they not like?
  - Would they ever consider volunteering to be citizen scientists on a real project?
  - Ask them if they think it is important for public participants to follow the same standardized data collection methodology. Why?

Student Worksheet

**Pollinator Monitoring Datasheet**

Instructions: 1. Fill out top part of data sheet; 2. Set timer (10 minutes for each 10 feet), and when ready start timer; 3. Note any floral visitors you see and identify to your confidence level; 4. Keep walking until time is up; 5. Fill out remainder of top of datasheet; and 6. Make additional notes about the site.

Site name: \_\_\_\_\_ Date: \_\_\_\_\_

Observer name: \_\_\_\_\_ Data recorder name: \_\_\_\_\_

Observation start time: \_\_\_\_\_ Observation end time: \_\_\_\_\_

Weather at start: \_\_\_\_\_ Weather at end: \_\_\_\_\_  
(e. g. clear, partly cloudy, bright, overcast):

Sky at start: \_\_\_\_\_ Sky at end: \_\_\_\_\_  
(e.g. shade, temperature, rain, wind, etc.):

**Floral Visitor Identification Codes:**

Honey bee = HB  
Other bee = OB  
Fly = F  
Wasp = W

Moth/Butterfly = MB  
Spider = S  
Ant = A  
Unidentified Flying Insect = UFI

Observation			
Important: Remember to look out for flowers, stand so that you do not cast a shadow, and only identify floral visitors to the level at which you are confident.			
	Floral Visitor Identification Code	Description of floral visitor (size, color, etc.)	Number of times identified floral visitor observed
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

	Floral Visitor Identification Code	Description of floral visitor (size, color, etc.)	Number of times identified floral visitor observed
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Notes on relative attractiveness of different plants to pollinators:

Did some types of plants attract a lot of pollinators? Which ones? Did some plants attract few pollinators? Which ones? Make any notes relevant to the relative attractiveness of different plants to pollinators here:

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