BENEFICIAL INSECTS FOR NATURAL PEST CONTROL:

Flower Scouting

PURPOSE

Beneficial insects like flower flies, soldier beetles and predatory wasps can provide important natural pest control in a farm or garden setting. This guide and worksheet is designed to help you assess the presence of beneficial insects visiting flowers in a farmscape. Many predatory and parasitoid insects use flowers for food. With this guide, you will be able to count these flower-visiting beneficial insects in habitat adjacent to crops. Use this guide along with our foliage and soil scouting guides to gain a better understanding of the beneficial insect community on your farm.

WHAT YOU NEED	• Clipboard, worksheet copy, and pen/pencil • Timer • Measuring tape (100-ft. preferred, shorter ok) • Thermometer (or means to collect weather info) • Flags or stakes (to mark transect lines) • Hand lens (optional)
WHERE TO USE	Flowering habitats adjacent to crops (e.g. field borders, hedgerows) or within crops (e.g. cover crops, beetle banks, insectary strips). Scouted habitat areas should be located in full sun and protected from pesticide applications.
WHEN TO USE	Twice per year , May – August • Visits separated by at least 2 to 3 weeks • Visits between 10:00 AM and 3:00 PM Warm, sunny, and calm conditions • Temperatures >60 °F (15.5 °C) • Skies sunny to partly cloudy or bright but overcast



HOW TO SCOUT

You will be conducting visual observations of insects on flowers along two 100 ft.-length transect lines (scouting paths) for 7.5 minutes per transect line. A transect line may be divided into shorter lengths for small habitat areas (see worksheet for more info). Before scouting, assess habitat area(s) to ensure that flowers are present to scout.

- Lay out measuring tape to define your transect lines. Use flags to mark them if needed.
- Set your timer for 7.5 minutes and ready your clipboard and worksheet.
- Begin your timer and slowly walk the designated transect line, observing and recording foraging flower visitors. Focus on benefical insects listed (see photos to right). Record only those beneficial insects observed within a 3 ft. distance from the transect line.
- Walk slowly while scouting for insects. Avoid sudden movements and visual interference from your shadow that may scare off insects.
- Pace all transect walks to end simultaneous with the timer. If timer ends before you complete the entire transect distance, quickly assess the remaining length.
- *Consistency is key for good scouting!* When scouting between transects and scouting dates, try to use the same methods as much as possible.

Acknowledgments: Guide created by Thelma Heidel-Baker, Sarah Foltz Jordan, Jarrod Fowler, and Eric Lee-Mader of The Xerces Society. Photos by Sarah Foltz Jordan (1, 2, 4) and Thelma Heidel-Baker (3, 5).

Adapted from: Ward, K., D. Cariveau, E. May, M. Roswell, M. Vaughan, N. Williams, R. Winfree, R. Isaacs, and K. Gill. 2014. Streamlined bee monitoring protocol for assessing pollinator habitat. 16 pp. Portland, OR: The Xerces Society.

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FLOWER SCOUTING WORKSHEET

XERCES SOCIETY for Invertebrate Conservation

Site Name: _____ **Date:** _____ / _____ / _____

Observer: _____ **Time:** _____ AM / PM

Visit #: _____of _____ **Temperature**: _____ºF **Skies (circle one):** Clear / Partly Cloudy / Bright Overcast

Type of Habitat (circle): Cover Crop / Beetle Bank / Field Border / Hedgerow / Insectary Strip / Other: _____

CHOOSE ONE OF THREE SURVEY OPTIONS BASED ON HABITAT TYPE OR HABITAT SIZE:

Large habitat areas: Survey two 100-foot transect lines for 7.5 minutes each. Transects should be located near the habitat center or edge and separated by at least 250 feet.

Hedgerows: Survey two 100-foot transects, located on each side of the hedge, for 7.5 minutes each

Smaller, divided, or odd-shaped habitat areas: Survey an equivalent of 200 feet of transect(s) for 15 minutes. The transect line may be divided, curved, etc. to meet the 200-foot requirement.

DIRECTIONS:

Conduct observations between 10:00 AM and 3:00 PM, when temperatures are over 60°F, skies are clear, partly cloudy or bright overcast, and wind speeds are gentle. For each transect, record the number of flower flies, lacewings, lady beetles, wasps, ambush bugs, soldier beetles, and other predators visiting flowers within 3 ft. of your transect line. See flower scouting protocol for further details. If interested in pollinators, note bees observed in the Notes section.

Transect Number	Transect Length (ft.)	Start Time	End Time	# Flower Flies	# Soldier Beetles	# Lacewings	# Wasps	# Ambush Bug	# Other	Notes
Transect 1										
Transect 2										
Transect 3 *(if needed)*										
Transect 4 *(if needed)*										
Total Length	*(should be 200 ft)*									

ADDITIONAL OBSERVATIONS (Habitat area details, plant species in bloom, etc.):

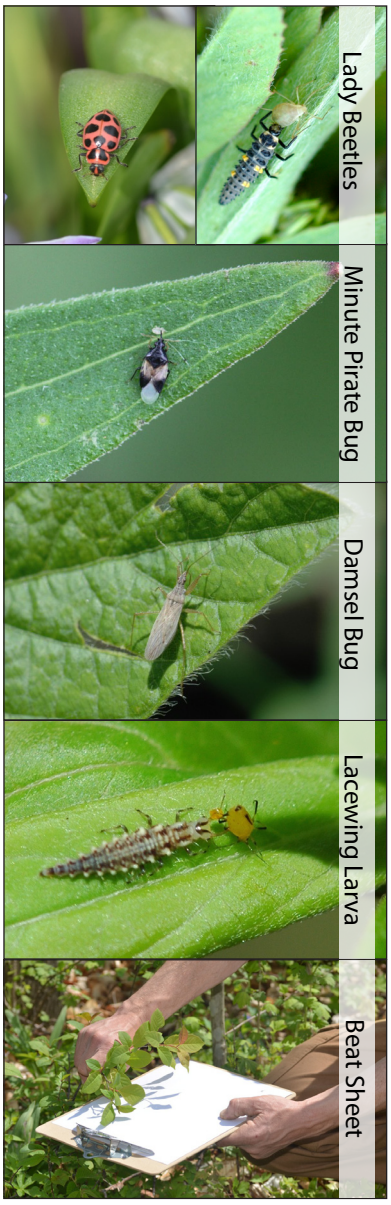
BENEFICIAL INSECTS FOR NATURAL PEST CONTROL:

Foliage Scouting

PURPOSE

Beneficial insects like lady beetles, damsel bugs, and lacewing larvae can provide important natural pest control in a farm or garden setting. This guide and worksheet is designed to help you assess the beneficial insects present - though not always readily visible - in plant vegetation. Many beneficial insects hunt and rest in plant vegetation. Using a simple tool called a beat sheet, you will be able to count the foliage-dwelling predatory insects in habitat adjacent to crops. Use this guide along with our flower and soil scouting guides to gain a better understanding of the beneficial insect community on your farm.

WHAT YOU NEED	• Beat sheet (blank sheet of paper) • Clipboard (for beat sheet and worksheet) and pen/pencil • Timer • Measuring tape (100-ft. preferred, shorter ok) • Flags or stakes (to mark transect lines) • Thermometer (or means to collect weather info) • Hand lens (optional)
WHERE TO USE	Undisturbed habitats adjacent to crops (e.g. field borders, hedgerows, woodland edges) or within crops (e.g. cover crops, beetle banks, insectary strips). Scouted habitat areas should be located in full sun and protected from pesticide applications.
WHEN TO USE	Twice per year, June-September • Visits separated by at least 2 to 3 weeks • Visits between 10:00 AM and 3:00 PM Warm and calm conditions • Temperatures >60 °F (15.5 °C) • Skies sunny to partly cloudy or bright but overcast



HOW TO SCOUT

You will use an insect beat sheet (see image, right) to observe beneficial insects on plant foliage along two 100 ft.-length transect lines (scouting paths). Observations will occur for 7.5 minutes along each 100 ft. transect. Smaller habitat areas may require a transect line to be divided into shorter lengths.

- Select the habitat area(s) you want to monitor, and lay out the measuring tape to define your transect lines. Use flags to mark the transects if needed.
- Set your timer for 7.5 minutes and ready your beat sheet and worksheet. Begin your timer and slowly move along the transect line, using the beat sheat as you go.
- To use the beat sheet, choose a handful of stems near the top of herbaceous plants or ends of branches on woody plants then carefully bend the plant material over the insect beat sheet. Smartly tap the plant material onto the beat sheet several times to shake insects out of the vegetation.
- Quickly and briefly observe insects on the sheet. Record observations of beneficial insects onto the worksheet. Use images to the right as a starting point for common beneficial insects you may observe.
- Only plants within 3 ft. of the transect line should be sampled.
- Try to pace all transect walks to end simultaneous with the timer. If timer ends before you complete a transect, quickly assess the remaining transect left.

Acknowledgments: Guide created by Thelma Heidel-Baker, Sarah Foltz Jordan, Jarrod Fowler, and Eric Lee-Mader of The Xerces Society. All photos taken by Thelma Heidel-Baker.

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FOLIAGE SCOUTING WORKSHEET

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Site Name: _____ **Date:** _____ / _____ / _____

Observer: _____ **Time:** _____ AM / PM

Visit #: _____of _____ **Temperature**: _____°F **Skies (circle one):** Clear / Partly Cloudy / Bright Overcast

Type of Habitat (circle): Cover Crop / Beetle Bank / Field Border / Hedgerow / Insectary Strip / Other: _____

CHOOSE ONE OF THREE SURVEY OPTIONS BASED ON HABITAT TYPE OR HABITAT SIZE:

Large habitat areas: Survey two 100-foot transects for 7.5 minutes each. Transects should be located near the habitat center or edge and separated by at least 250 feet .

Hedgerows: Survey two 100-foot transects, located on each side of the hedge, for 7.5 minutes each

Smaller, divided, or odd-shaped habitat areas: Survey an equivalent of 200 feet of transect(s) for 15 minutes. Transect may be divided, curved, etc. to meet the 200-foot requirement.

DIRECTIONS:

Conduct observations between 10:00 AM and 3:00 PM, when temperatures are over 60°F, skies are clear, partly cloudy or bright overcast, and wind speeds are gentle. For each transect, use the Insect Beat Sheet and record the number of lady beetles, minute pirate bugs, lacewing larvae, damsel bugs, and other predaceous insects found on plant vegetation along your transect line. See foliage scouting guide protocol for additional scouting details.

Transect Number	Transect Length (ft.)	Start Time	End Time	# Lady Beetles	# Minute Pirate Bugs	# Damsel Bugs	# Lacewing Larvae	# Other Predators	Notes
Transect 1									
Transect 2									
Transect 3 *(if needed)*									
Transect 4 *(if needed)*									
Total Length	*(should be 200 ft)*								

ADDITIONAL OBSERVATIONS (Habitat area details, plant species in bloom, etc.):

BENEFICIAL INSECTS FOR NATURAL PEST CONTROL:

Soil Scouting

PURPOSE

Beneficial insects like predatory ground beetles and even spiders can provide important natural pest control in a farm or garden setting. This guide and worksheet is designed to help you assess the presence of predatory organisms that hunt and rest on soils. Using catch-and-release pitfall traps, you will be able to easily detect and count these soil-surface predators. Use this guide along with our flower and foliage scouting guides to gain a better understanding of the beneficial insect community on your farm.

WHAT YOU NEED	• Clipboard , worksheet copy, and pen/pencil • Small spade or trowel • Containers for pitfall traps (e.g., plastic drinking cups or large yogurt containers, ideally with lids) • Flags or stakes (to mark trap locations)
WHERE TO USE	Undisturbed habitats adjacent to crops (e.g. field borders, hedgerows, woodland edges) or within crops (e.g. cover crops, beetle banks, insectary strips). Scouted habitat areas should be located in full sun and protected from pesticide applications.
WHEN TO USE	Twice per year, July-September • Visits separated by at least 1 month • Deploy pitfall traps in early evening • Empty traps as soon as possible the next morning Warm conditions with daytime temperatures >60 °F (15.5 °C) Avoid sampling in rainy conditions that may flood traps



HOW TO SCOUT

You will be setting out catch-and-release pitfall traps (see photo, right) to observe and record soil-surface predators. The number of traps you will set out is dependent on the number of habitat areas you are interested in monitoring. We recommend one or two pitfall traps per habitat feature of interest, placed at least 50 ft. apart (further apart in larger habitat areas).

- **Select habitat area(s) you want to monitor.**
- **Deploy traps in late afternoon or early evening.** Dig an appropriate-sized hole in each location you wish to survey. Place container (lidded if possible) inside the hole so that its rim is level with the soil surface. (Using lid prevents dirt from spilling into bottom of the trap, and a dirt-free container makes trap evaluation easier the next morning.) Once the container is well-positioned, fill dirt in around the container and carefully remove the lid.
- **Use flags or stakes to mark trap locations.** Mark trap locations to ensure you can find traps again the next morning.
- **Revisit traps the following morning.** Use provided worksheet to record any predators in traps. Use photos at right for guidance on commonly caught predators.
- **Remove trap, or place lid on the trap (if reusing).** The stake/flagging should be left in place for the next survey date. Traps can be left in place, but must be covered to prevent further captures during the interim period. If farm practices (like mowing) prevent use of physical markers in some habitat areas, then a detailed description of trap locations is needed.

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Acknowledgments: Guide created by Thelma Heidel-Baker, Sarah Foltz Jordan, Jarrod Fowler, and Eric Lee-Mader of The Xerces Society. All photos taken by Sarah Foltz Jordan.

SOIL SCOUTING WORKSHEET

XERCES SOCIETY for Invertebrate Conservation

Site Name: _____ **Observer:** _____

Date Trap Deployed:_____ / _____ / _____ **Time:** _____ AM / PM

Date Trap Emptied: _____ / _____ / _____ **Time:** _____ AM / PM

Visit #: _____of _____ **Temperature**: _____°F **Skies (circle one):** Clear / Partly Cloudy / Bright Overcast

DIRECTIONS:
Conduct monitoring twice per year from July-September, with survey dates separated by at least one month. Deploy traps in the early evening and empty them the following morning. Avoid rainy or unusually cold conditions. We recommend one or two pitfall traps per habitat feature of interest (e.g., native field border, cover crop field, beetle bank, etc.). Take care to place each trap so that the rim is perfectly level with the soil surface. See protocol for further details.

Trap Number	**Habitat Type** (field border, cover crop, hedgerow, etc.)	**Microhabitat** (sandy soil, straw mulch, wood chips, etc.)	**# Ground Beetles**	**# Ground-Dwelling Spiders**	**# Tiger Beetles**	**Notes**
Trap 1						
Trap 2						
Trap 3						
Trap 4						
Trap 5						
Trap 6						

(Expand data sheet if additional traps are used.)

ADDITIONAL OBSERVATIONS (Habitat area details, plant species in bloom, etc.):