

A close-up photograph of a green leaf, showing the intricate network of veins and the slightly waxy texture of the surface. The lighting is soft, highlighting the natural patterns of the leaf.

Life on the Purple Loosestrife: A Citizen Scientist Project

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A few notes about this file:

- This is a version of a Powerpoint presentation given as part of the Technology Tools for Community Science section of the 4th Annual Conference of the Massachusetts Water Resources Research Center. The abstract is available at <http://www.umass.edu/tei/wrrc/WRRC2004/Conference2007/Abstracts.htm#forman>.
- The data and analysis in this presentation is accurate as of April 15, 2007, and is subject to change as we are still collecting data for the Life on the Purple Loosestrife project (<http://www.flickr.com/groups/lifeontheloosestrife/>).
- I am very grateful to the photographers who allowed me to use their photos for this presentation. Any photos you see here by JFO, crfullmoon or aaron_c are covered under a Creative Commons NC-SA license. For all other photos, permission from the photographers is required for any use.
- If you wish to use the data included here, please cite Jennifer Forman Orth, April 15, 2007. I plan on publishing this work in a peer-reviewed journal so if you are reading this long after that date, check with me to see if this has been replaced with a more traditional citation.
- I can not say thank you enough to the photographers who have made this project possible! Many of you probably still don't consider yourselves Citizen Scientists but without you, there would be no data!

Purple loosestrife (*Lythrum salicaria*)

- A wetland plant native to Europe
- Introduced to the US in the mid-1800s
- Now considered invasive in many parts of the US and Canada
- Has been implicated in loss of native biodiversity, negative impact on native frogs



Photo by: JFO

Can a team of citizen scientists answer these questions?

- What evidence is there that organisms are interacting with Purple Loosestrife?
- How dependent are these organisms on Purple Loosestrife?
- What role do these organisms play in the spread of Purple Loosestrife?

Background

- Discovered a growing community of nature photographers existed online.
- Began photographing insects on invasive plants.
- In July 2005, the “Life on the Purple Loosestrife” Citizen Scientist photography project began.

Methods

- Enlist Citizen Scientists
- Set Group Guidelines
- Identify Taxa and record Geographic Data
- Data Analysis
- Comparison to other studies

Methods

- Enlist Citizen Scientists
 - **Flickr**: a web-based photo sharing community
 - Flickr Groups can be created to collect photos with a single theme
 - Invite Flickr nature photographers
 - Recruit people to join Flickr (it's free)
 - Advertise in related Flickr groups (nature photography, insects, invasive species, macro photography, etc.)
 - Search Flickr for photos of Purple Loosestrife and invite those photographers to join the group

<http://www.flickr.com/groups/lifeontheloosestrife>



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Search this group's pool

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Life on the Purple Loosestrife

[Administration](#) | [Discussion](#) | [Pool](#) | [Map](#) | [44 Members](#) | [Invite](#)

Group Photo Pool ([See all 195 photos](#))



NEW From [in2n8r](#) [X]



NEW From [in2n8r](#) [X]



From [Dimilichen](#) [X]



From [moonwatcher13](#) [X]



From [Kuroshiro](#) [X]



From [lirw](#) [X]

[More photos...](#)

Discuss

Title	Author	Replies	Latest Post
Will your ears be burning?	urtica	0	5 weeks ago
Raw Data	urtica	0	5 months ago
Interesting article about pollinators and purple loosestrife	urtica	0	5 months ago
Draft version of poster	urtica	4	6 months ago
New Group: Life on the Japanese Knotweed	urtica	1	7 months ago
Preliminary 2005 Data - The Basics	urtica	5	7 months ago

6 of 17 posts | [Read all Life on the Purple Loosestrife's discussions](#)

[» Post a new topic](#)

About Life on the Purple Loosestrife

Any insect, spider, etc. seen on or in a flower of purple loosestrife (*Lythrum salicaria*).

Search discussions

[SEARCH](#)

(Or, [browse all topics](#).)

Additional Information

This is a **public** group.

Methods

Group Guidelines:

- Post anything found anywhere at any time on Purple Loosestrife, *while it is on the plant*
- More than one photo per species is okay, but no multiple photos of the same individual (each photo is a record).
- Provide geolocation as specific as Citizen Scientist is willing.
- Place photos under a Creative Commons license (some people didn't, but have always willing to share if asked)

Methods

- Taxon Identification
 - IDs done by:
 - field guides, print and online (main source)
 - Citizen Scientists registered for the LOTPL project, other Flickr experts (retired biologists, naturalists, etc.)
 - various outside experts (including those at Bugguide.net)
 - ID errs on the conservative side, i.e. an organism is not counted as a taxon unless record is obviously distinct
 - Taxonomic classification was recorded from Class as far down as possible

Methods

- Other Metadata
 - Date, photographer, record number, geolocation
 - Common name, organism type, life stage
 - Feeding guild, activity observed, location on plant
- Data recorded in Excel
- Photos are tagged with all above data collected, and this information is **all publicly accessible**

Anatomy of a Flickr Photo Page

<http://www.flickr.com/photos/martytdx/27694440/in/photostream-1-lifeonthepurpleloosestrife/>



I'm not sure of the species (and it's too late to look it up at this time of night), but I tried forever to get this butterfly to sit still. I finally got this macro of him/her/it.

update: This is a **Horace's Duskywing** Butterfly (*Erynnis horatius*). See my reference picture [here](#)

Comments



PARS says:

Very nice.

Posted 21 months ago. ([permalink](#))



mimbrava pro says:

Great shot, and it's good that you could ID it for us.

Posted 21 months ago. ([permalink](#))



hearman pro says:

Very nice, you have patients in this case it sure paid off.

Posted 21 months ago. ([permalink](#))



hamanquin pro says:

Uploaded on July 21, 2005
by [martytdx](#)

+ [martytdx's photostream](#)

+ [Life on the Purple Loosestrife \(Pool\)](#) [X]

Tags

- fauna
- butterfly
- macro
- D70
- Horace's Duskywing
- Erynnis horatius
- purple loosestrife
- Lythrum salicaria
- Erynnis
- NJ
- pond
- July
- female
- BMNA
- midsize
- brown
- top-v111
- dorsal
- Hesperiidae
- Pyrginae
- Lythraceae [x]
- Lythrum [x]
- Lepidoptera [x]
- US [x]
- flower [x]
- loosestrife [x]
- Location: Haddonfield, NJ
- Location: Camden County, NJ
- insect
- lifelist:butterfly

Add a tag

Additional Information

- © All rights reserved
 - Taken with a Nikon D70.
 - [More properties](#)
 - Taken on July 21, 2005
 - See [different sizes](#)
 - 4 people call this photo a **favorite**

Results (preliminary)

- 195 photos (209 records) since July 25, 2005
- Currently 44 registered photographers, 22 have submitted photos
- Photo locations:
 - US (MA, MI, NH, NJ, PA), Canada, Germany, Spain, U.K.

Results (preliminary)

- 4 Taxonomic Classes:
 - Arachnida* (spiders)
 - Dicotyledoneae (plants)
 - Gastropoda (snails)
 - Insecta** (insects)

Results (preliminary)

- 14 Taxonomic Orders:

Insects/Spiders & Kin

Araneae* (Spiders)
Coleoptera* (Beetles)
Diptera* (Flies)
Hemiptera* (True Bugs)
Homoptera (Hoppers)
Hymenoptera** (Bees/Wasps)
Lepidoptera** (Butterflies and moths)
Mecoptera (Scorpionflies et al.)
Neuroptera (Lacewings et al.)
Odonata (Dragonflies and Damselflies)
Orthoptera (Grasshoppers and Crickets)

Plants

Fabales (Legumes)
Polygonales (Smartweeds)

Snails

Unknown Snail Order

Results (preliminary)

- 49 Taxonomic Families:

Insects/Spiders & Kin

Acanaloniidae
Acrididae
Anthocoridae
Aphididae
Apidae**
Araneidae
Cantharidae
Chrysopidae
Cicadellidae
Coccinellidae
Coenagrionidae
Curculionidae
Dolichopodidae
Elateridae
Fabaceae
Flatidae
Formicidae*
Geometridae
Halictidae
Hesperiidae*
Lampyridae
Libellulidae

Linyphiidae
Lycaenidae
Megachilidae
Miridae
Nymphalidae
Oecanthidae
Panorpidae
Papilionidae
Pentatomidae
Phalacridae
Phymatidae
Pieridae*
Polygonaceae
Pompilidae
Salticidae
Scarabaeidae*
Syrphidae*
Tephritidae
Tetragnathidae
Thomasidae
Tortricidae
Vespidae

*plus unknown but distinct
Hemipterans (3), Fulgoroid
planthopper (1), Caelifera sp. (1)*

Plants

Fabaceae
Polygonaceae

Snails

Snail Family 1

Results (preliminary)

- Summary of Taxonomic Results:
 - 4 Classes
 - 14 Orders
 - 49 Families
 - 52 Genera
 - At least 93 Species

Results (preliminary)

- Orders with Highest Diversity
 - Lepidoptera (butterflies – 17 genera)
 - Hymenoptera (bees/wasps – 8 genera)
- Most Commonly Photographed Orders
 - Hymenoptera (bees/wasps – 51 records)
 - Lepidoptera (butterflies – 46 records)

Results (preliminary)

- Parts of Purple Loosestrife Used:

flower/fruits	137
leaf	54
whole plant	2
stem	21
Total	214*

* Some photos feature more than one subject and are counted twice

Results (preliminary)

- Life Stage Observed:

Adult	181
Larva/Nymph	10
Egg	2
N/A	7
Unknown	9
Total	209*

* Some photos feature more than one subject and are counted twice

Results (preliminary)

- Feeding Guild:

Pollinator	81
Herbivore	59
Predator	37
Unknown	23
Habitat User	10
Fungivore	1
Detritivore	1
Total	212

- Some photos feature more than one subject and are counted twice.
- Some organisms are in more than one feeding guild and are counted twice.

Patterns – Feeding



Photo by: crfullmoon

Honeybee (*Apis mellifera*)



Photo by: Marty DeAngelo

Arogos skipper? (*Atrytone arogos*)

Patterns - Feeding



Photo by: JFO

Black swallowtail
(*Papilio polyxenes*)



Photo by: Deb Lievens

Baltimore checkerspot
(*Euphydryas phaeton*)

Patterns - Herbivory



Photo by: crfullmoon

Japanese beetle
(*Popillia japonica*)



Photo by: JFO

scarlet plant bug
(*Lopidea sp.*)

Patterns - Predation



Photo by: Jean Simard

black and yellow argiope
(*Argiope aurantia*)



Photo by: crfullmoon

Crab spider (Thomisidae sp.)

Patterns - Habitat



Photo by: crfullmoon

bindweed (*Fallopia sp.*)

Patterns - Habitat



Photo by: crfullmoon

lightning bug (Lampyridae sp.)



Photo by: ophis

slaty skimmer (*Libellula incesta*)

Patterns - Habitat



Photo by: crfullmoon



Photo by: crfullmoon

ant (Formicidae sp.)

Patterns – Habitat (Farming)

acrobat ant
(*Crematogaster cerasi*)

aphid (Aphididae sp.)



Photo by: JFO

Patterns – Habitat (Mating)



Photo by: crfullmoon



Photo by: Lisa Ruokis
<http://leaf.sipro.com>

Japanese beetles (*Popillia japonica*)

Patterns – Habitat (Reproduction)



Photo by: JFO

cocoon



Photo by: JFO

green lacewing
(Chrysopidae sp.)

Comparison with a peer-reviewed study:

- **Insects associated with purple loosestrife, *Lythrum salicaria* L., in southern Manitoba.** Diehl, JK; Holliday, NJ; Lindgren, CJ; Roughley, RE. 1997. *Canadian Entomologist* 129(5): 937-948.
 - data collected 1994-1995
 - six sites in southern Manitoba, Canada
 - collection methods: sweep-netting, vacuum sampling, hand collecting
 - insects only

Comparison with a peer-reviewed study:



Yellow Pin: Diehl et al. study

Blue Pins: LOTPL volunteers

<http://maps.google.com/maps/ms?ie=UTF8&hl=en&om=1&z=3&ll=45.95115,-44.121094&spn=85.031142,164.53125&msid=110961822803486098399.00000111d4d8dfbca4319&msa=0>



Diehl et al.:

- 7 insect orders
- 38 families
- 63 genera

LOTPL:

- 10 insect orders
- 44 families
- 47 genera

Diehl et al.:

- more exact id
- more predator species
- more larva
- many smaller species
- more specimens found on leaves

LOTPL:

- many more pollinators
- most specimens observed on flowers
- more adults

Benefits of this project:

- Citizen Scientist team can cover a wide geographic area with little additional resources.
- Photos are easier to collect and share than physical samples.
- Photos are “digital vouchers” of activity, and can often provide better proof of observation than descriptive text.
- All raw data is publicly accessible, searchable.
- No (ok, few) creatures were harmed in the taking of these photos.
- Provides educational outreach, community involvement.

Disadvantages of this project:

- No physical vouchers - if a detail is not captured by the photographer, it is lost (ID can be hard)
- More likely to miss “skittish” creatures
- Biased towards larger, more eye-catching organisms
- Biased against anything that is good at hiding, or is in the soil (root weevils)
- Sacrifices depth for breadth

Conclusions

Purple Loosestrife:

- is used as a habitat by insects, spiders, snails and even other plants.
- has flowers that are visited by a number of generalist pollinators/nectar feeders (bees butterflies and flies)
- has some herbivores sampling its vegetation (and sap)
- is used as a hunting ground, a resting place
- is used as mating habitat, egg-laying habitat, and pupating habitat

Conclusions

Purple Loosestrife:

- is attractive to nature photographers.
- provides food and habitat to a diverse array of organisms that also attract photographers.

Conclusions

Citizen Scientists:

- can complete research that is valuable to the scientific community.
- can produce results equivalent to standard, rigorous, peer-reviewed research done by biologists.

Can a team of citizen scientists answer these questions?

- What evidence is there that organisms are interacting with Purple Loosestrife?
 - Native and non-native plants, insects and other organisms
- How dependent are these organisms on Purple Loosestrife?
 - TBD. A better question: Is purple loosestrife displacing native plants as a pollen/nectar source?
- What role do these organisms play in the spread of Purple Loosestrife?
 - Promoters of seed production; None are seriously impacting ability of Purple Loosestrife to grow and spread

Future Work

- Continue collecting data
- Reach out to people in the USA (43/50), other countries (at least 12)
- Encourage Citizen Scientist photographers to submit site descriptions
- Continue to refine data set (species origin)
- Comparison to other available scientific studies of Life on the Purple Loosestrife.



Photo by: aaron_c

Acknowledgements

The Life on the Purple Loosestrife Project Citizen Scientist team:

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- Old Shoe Woman
- ophis
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- urtica (me! 😊)
- Wrobel Photographic Arts

Also: EFG Project at UMass Boston, Bugguide.net

<http://www.flickr.com/groups/lifeontheloosestrife>