

A Report on Invading Species HIGH LEVEL 1

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A Report On Invading Species



Photo by: Steven Jacobs, Department of Entomology, Penn State University

Laboratory Technician

Length of Investigation: Approximately 2 years (2001-2003)

To: The Ministry of Environment

To Whom It May Concern:

The following is what I have found during my two years of researching the Asian Lady Bug, which is invading Canada.

Key Characteristics

An invasive species is considered to be “one that is alien to the ecosystem and causes harm to the economy, the environment, or human health”, according to www.ers.com. The Asian Lady Bug, *Harmonia axyridis*, has made its way from Asia, to the United States, and recently into Canada. It poses no direct threat to the environment, however, is a large nuisance to the human population. They are really only “a pest by their presence” (www.doyourownpestpatrol.com). It is now very common to see a cluster of these pesky little ladybugs crawling up walls, windows, light fixtures, and any other surface they can land upon. Trees, forests, and homes are all at great risk of being taken over by the Asian ladybug because they are tree-dwelling insects

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(www.doyourownpestcontrol.com). It is not known how the Ladybugs spread so quickly throughout the United States, but there have been numerous attempts to have biological controls for the pesky ‘Halloween lady beetles’. The Asian ladybug has been a very important predator of aphid pests on trees in Asia and in the United States. They were originally introduced into the United States by Asia to serve as a biological control agent of various pests in a variety of ornamental and agricultural crops (www.nysaes.com). The ladybugs have adapted quite nicely to their new environment. Research has been done, and people who were experiencing the Asian ladybug in their homes were asked to report in what areas and to what degree the ladybugs caused damage. The results are as follows:

- 58% reported problems in their living rooms
- 53% reported problems in their bedrooms
- 46% reported problems in their kitchens
- 86% reported in or on windows throughout their house
- 64% reported problems on their ceilings
- 77% reported a foul odour from the lady bugs
- 71% reported stains on various surfaces throughout their house
- 42% reported being bitten by an Asian lady bug
- 41% reported that the lady bugs ended up falling in their food and drinks

(www.ipm.osu.edu/lady/icup.htm)

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Asia
(place of origin)

North America
(new/invading habitat)

The Asian ladybug has now adapted to its environment in Canada. They usually prefer the southwest side of buildings, and many move around during nightfall (www.ento.psu.edu.com). They live in clusters all over human homes, and repeated exposure has caused some people to have allergic reactions to them. They are very good at controlling soft-bodied insects such as scales, aphids, and psyllids, including pecan aphids, red pine scale, balsam twig aphids, and pine bark adelgid (www.ento.psu.edu.com). The Asian ladybugs enter houses through small openings around doors, windows, utility access pints, cracks and gaps in wood, and attic vents.

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Asian lady bugs crawling up a window

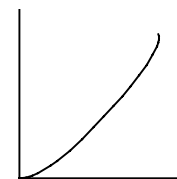
A swarm of ladybugs

Photos by: Maryann Frazier, Department of Entomology, Penn State University

Scientific Analysis of the Problem

Currently the amount of Asian Lady bugs is on the rise. They are growing enormously in Canada. The graph below represents “The past twenty years”, in my opinion:

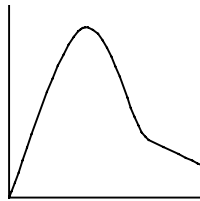
Exponential Growth



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In the future, I predict that the population of the Asian Lady bugs will most likely decline, not by extinction, but by simply decreasing with time. More control agents are being introduced to the Asian ladybug, which will help in decreasing the number of them in Canada. The following graph represents “The next 20 years”, in my opinion:

A decline in population



Like other newly introduced insects, populations will probably decrease gradually over the next few years. Experience shows that a population of any kind of new insect, pest, or beneficial, increase quickly in the few years after its introduction. Once populations of natural enemies have time to catch up, the beetle numbers should level off, and then slowly proceed to decline. However, there will obviously be several years as lag time, where the beetles are reproducing like crazy.

a) Biotic and/or Abiotic Factors at Risk

The Asian ladybug is not poisonous or harmful to pets, property, or to humans directly, although they do cause some allergies. They do not reproduce indoors. Though the ladybug doesn't carry a disease, they may bite in some rare cases (www.wvu.edu). The Asian ladybug is used to control aphids, and other soft-bodied insects, so their population rates are at risk. The greatest damage that ladybugs do is give great discomfort to homeowners. It is not uncommon for tens of thousands of beetles to congregate in buildings due to the warmth of the walls. (www.ento.psu.edu)

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Lady bugs migrating up a wall



Asian lady bugs congregating into a home

Photos by: Steven Jacobs, Department of Entomology, Penn State University

Sometimes the Asian ladybug will leave behind a smelly, yellow defensive chemical which can be spotted on walls and on other surfaces. Mild skin irritations have been noted in some individuals due to the chemical left behind. (www.ento.psu.edu)

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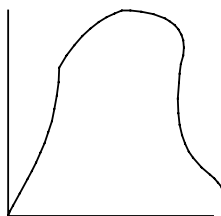
b) Impact on the human population and/or the environment in Ontario:

Immediate	Long-term
- allergies / skin irritations (i.e. itchy eyes, sneezing, congestion, and a runny nose)	- there isn't any long term affect, other than the mess and inconvenience that the lady bugs made
- help to control aphids and other insects	- perhaps diseases that spread from the Asian lady bugs
- homeowners uncomfortable/annoyance	

Predictions for the future

It is predicted that in the future the Asian ladybug population will increase, then slowly, over time, decrease. As mentioned in the report earlier on, it is predicted that the population of other natural enemies will increase, therefore the Asian ladybug population will decrease (i.e. The food chain). This proves that over time natural balances itself out, without human intervention.

A "belle curve"



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Recommendations, with justifications, to the Ministry of Environment for a course of action

I strongly recommend more awareness of the Asian ladybug, and its invasion into Canada to the public. Homeowners should be taught the correct measures to be taken when dealing with these pesky insects. Homeowners should use a high-quality silicone caulk to seal all cracks in windows, doors, or in walls. It is recommended that the homeowners should look for the place that the lady bugs gain access, and go from there. Ultra-violet light traps may prevent the ladybugs from flying or crawling around the house. It should be noted that there must be a glue strip if there is an ultra-violet light in the house, which will catch the dead ladybugs. A use of a vacuum is very beneficial in the aid of getting rid of the pesky ladybug. However, some homeowners who have taken this route complain of a real raunchy smell as they suck up the ladybugs. It is very important to make sure that the vacuum bag is emptied after using it to suck up all the lady bugs (www.ento.psu.edu/extension/factsheets/multc_asian_ladybeetle.htm).

**Control Checklist**

- ✓ make sure that windows and doors are sealed with weather stripping
- ✓ prevent entry by caulking all cracks in windows, doors, siding, and utility pipes
- ✓ check light fixtures and windows often, because the lady bugs are attracted to light
- ✓ install a mesh or finer screen over exhaust vents
- ✓ check attic and basement for entry sites
- ✓ use a vacuum to pick up and throw out the clusters of lady bugs

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- ✓ is using an insecticide, make sure to pick up and dispose of the dead bugs
- ✓ seal, using silicon caulking, if living in a log home
- ✓ DO NOT use a pesticides
- ✓ Be patient; eventually the lady bugs will leave
(www.ag.ohio-state.edu/~ipm/lady/blt.htm)

So severe cases, indoor traps are available as well. Whatever the degree of the ladybug invasion, it is very important to keep the public aware, and educated on how to deal with these pests. My recommendation of a course of action is to bring up the Asian lady bug at our next town meeting, and to perhaps get some flyers / pamphlets printed up, which with keep people knowledgeable about the issue.

Thank you very much for taking the time to read about my investigation. I hope my report will influence you to take action with regards to the Asian ladybug invasion into Canada.



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Teacher’s Notes**Knowledge/Understanding**

- The student demonstrates limited understanding of how the invading species has adapted. He or she gives examples of ladybug behaviour (e.g., “many move around during nightfall”), but without linking them to adaptations. The student makes only very general statements about adaptation (e.g., “The ladybugs have adapted quite nicely to their new environment”; “The Asian ladybug has now adapted to its environment in Canada.”).

Inquiry

- The student analyses the actual or potential problem with limited effectiveness. Although specific problems are mentioned (e.g., “a foul odour” in infested homes, “allergic reactions”), the student addresses only the impact of the insect on humans in any detail. He or she mentions the ladybug’s effectiveness at “controlling soft-bodied insects”, but gives no sense of the magnitude of the impact on these insects, or the extent to which the impact is harmful or beneficial.
- The student predicts the future impact of the invading species with limited effectiveness. He or she predicts that the exponential growth in the numbers of ladybugs will be followed by a decline “Once populations of natural enemies have time to catch up”. However, the student does not consider the future effects of the Asian ladybug on native aphid and ladybug species.

Communication

- The student communicates information in graph/chart/table format with limited clarity. The graphs that represent the exponential growth in the Asian ladybug population, and then a projected decline, are schematic and do not show any numerical data. The significance of the ‘belle curve’ is unclear. There are no labels on the axes of the graphs. The student includes maps to show the distribution of the Asian ladybug, but the maps have no legends to permit interpretation.

- The student communicates ideas and information with some clarity. He or she defines the term “invasive species”, which provides a good introduction to the report. However, some terms are vague or unhelpful in a scientific report (e.g., “real raunchy smell as they suck up the ladybugs”, “reproducing like crazy”). The report is organized into logical sections, but some parts of the report are repetitive. There are several visuals in the report, but they do little to enhance the scientific content.

Making Connections

- The student recommends and justifies a course of action of some effectiveness. He or she sees public awareness as the key to combating the invasion (e.g., “Homeowners should be taught the correct measures to be taken when dealing with these pesky insects”). However, the student provides no justification for this choice and little indication of the steps that should be taken to bring about public awareness (e.g., “to perhaps get some flyers/pamphlets printed up”). While some suggested actions are obvious ways to keep ladybugs out of homes (e.g. caulking, weather stripping), no justification or procedure is given for less obvious actions (e.g., the use of “Ultra-violet light traps”).

Comments

This work is representative of a high level-1 performance. The student demonstrates a limited degree of achievement of the expectations in the Knowledge/Understanding and Inquiry categories of knowledge and skills. The student also demonstrates a limited degree of achievement with respect to one criterion in the Communication category. However, with respect to the Making Connections category and one criterion in the Communication category, the student demonstrates some degree of achievement – i.e., achievement that is more characteristic of level 2.

Next Steps

In order to improve his or her performance, the student needs to:

- describe specific adaptations of the invading species;
- provide more details of the impact on native species;
- use scientific data to draw graphs and make predictions;
- label graphs and maps clearly;
- edit and proofread the report to eliminate vagueness and repetition;
- give more details of how the recommendation could be implemented;
- justify the recommendation.