Primary Literature Identification (Sciences)

- Primary Research Literature
- Peer Review
- What's Not a Primary Research Article?

This handout specifically addresses Primary Sources in Science. For information about locating Scholarly and Peer-Reviewed journals in general, see Identifying Scholarly Journals.

Primary Research Literature

In the sciences, primary literature reports on research conducted by the authors.

When you see an article in a scientific journal, there are several clues that it is primary literature. The most important clues are 1, 2, 4, and 5 below.

1. The authors are identified.

   Biological Conservation
   journal homepage: www.elsevier.com/locate/biocon

   Community and ecosystem consequences of giant knotweed (Polygonum sachalinense) invasion into riparian forests of western Washington, USA

   Lauren S. Urgenson\textsuperscript{a,b,*}, Sarah H. Reichard\textsuperscript{b}, Charles B. Halpern\textsuperscript{a}

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   \textbf{ABSTRACT} \\
   The invasive, non-native herb, giant knotweed (Polygonum sachalinense), is becoming common in riparian corridors throughout North America and Europe. Despite its prevalent study of its ecological impacts. We investigated the effects of knotweed invasion and diversity of forest understory plants, and the quantity and nutrient quality in riparian forests in western Washington, USA. Among 19 sampling locations, knot
   \end{tabular}

2. The authors’ affiliations are identified. These are usually universities or scientific institutions.

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3. Sometimes the abstract shows evidence that the article is about the author’s own research:
4. The authors explain how they did their research. Look for a “Methods,” “Materials and Methods,” or “Experimental” heading within the article. In shorter articles, often called brief reports, short communications, or letters, there won't be any internal headings but if you read carefully, you will find a brief explanation of how the authors did their research.

5. The authors report their findings. Look for a “Results” heading within the article.” In shorter articles, often identified as brief reports, short communications, or letters, there won't be any internal headings, but if you read the article you will find that the authors report their findings.

6. The authors identify the references they used as background for their research. Science advances by building on previous research, and it's important to acknowledge the work that has gone on before. Note that secondary literature, such as review articles also have references. (For more on review articles, see What's Not a Primary Research Article below.) However, the absence of any references is a strong clue that you are not looking at a primary article.

7. Primary articles often contain graphs and tables. However, secondary literature, such as review articles may also have graphs and tables.

Peer Review

Primary articles are often peer reviewed (sometimes called “refereed”). However, secondary literature, such as review articles may also be peer reviewed. Peer review means that the article was read and critiqued by other experts on the topic at the request of the editor of the journal. Often the peer reviewers will ask for clarifications or changes to the article. Once the authors have completed their revisions, the article is accepted. You can often determine that an article is peer reviewed by looking at the article for the date received and the date accepted or date published. The article...
was peer reviewed in the interval between those dates.

- Sometimes the indication appears just below the authors and affiliations.

**Evidence for massive clonal growth in the invasive weed *Fallopia japonica* (Japanese Knotweed)**

MICHHELLE L. HOLLINGSWORTH*

*Royal Botanic Garden, 20A Inverleith Row, Edinburgh, EH3 5LR*

JOHN P. BAILEY

*Biology Department, University of Leicester, University Road, Leicester, LE1 7RH*

Received December 1999; accepted for publication May 2000

- Here's another possibility for indication of peer review near the start of an article:

**Community and ecosystem consequences of giant knotweed (*Polygonum sachalinense*) invasion into riparian forests of western Washington, USA**

Lauren S. Urgenose*, Sarah H. Reichard*, Charles B. Halpern

*College of Forest Resources, University of Washington, Box 352, Seattle, WA 98195-2100, USA*

*University of Washington Botanic Gardens, 2541 15, Seattle, WA 98115-2100, USA*

**Abstract**

The invasive, non-native herb, giant knotweed (*Polygonum sachalinense*), is becoming established in riparian corridors throughout North America and Europe. Despite its prevalence, limited study of its ecological impacts. We investigated the effects of knotweed invasion and diversity of forest understory plants and the quantity and nutrient quality in riparian forests in western Washington, USA. Aimee L. Amerson, locations, knot

**Introduction**

Riparian vegetation strongly influences rivers (Cummins et al. 1989; Wallace et al. 1997; Naiman et al. 2003), and therefore any changes to its structure and composition will have corresponding effects on organisms and ecological processes within the stream channel (e.g., Bärlocher and Graça 2002; Kennedy and Hobbs 2004; Lecerf et al. 2005). Riparian vegetation provides leaf litter as a primary energy supply to most forested low-order streams (Cummins et al. 1989; Wallace et al. 1997). Aquatic hyphomycetes fungi and benthic invertebrates rely heavily on leaf accumulations as both food and habitat (Cummins et al. 1989; Bärlocher 1992; Graça 2001). In turn, aquatic hyphomycetes and shredder invertebrates (leaf consumers) play an essential role in the breakdown of leaf litter, a key ecosystem-level process ensuring the transfer of leaf carbon and nutrients toward higher trophic levels (Bärlocher 1992; Gessner et al. 1999; Graça 2001). Besides being controlled by the activity of leaf consumers, litter breakdown rates is also regulated intrinsically

- Sometimes the peer review information is at the bottom of the first page of the article:

- Sometimes it is at the end of the article after the references:
Even if you cannot find any dates, the journal could be a peer reviewed journal. Try entering the journal title into Google. The publisher’s website for the journal is usually among the first several results. Publishers are proud to publish peer reviewed journals and will usually indicate peer review in their websites. Look for links like “About this Journal,” or “Librarian information.” Here’s an example:

What’s Not a Primary Research Article?

- **News reports** about research—though the report may have information you can use to find the primary research article.
- **Encyclopedia articles**—never report original research.
- **Review articles**. These are surveys of the literature on specific topics that summarize and explain the research of others and/or the previously published work of the authors, and are considered secondary sources. They often look very similar to primary research articles, but they are not. Here’s how to tell:
  - No “Methods,” “Materials and Methods,” or “Experimental” section or details. (Compare to #4 in the section on primary research articles above.)
  - No “Results” section or details. (Compare to #5 in the section on primary research articles above.)
  - The authors reference other sources throughout the paper. (In primary research articles, most references to others’ work are generally confined to the introduction and discussion sections.)
- **Databases** like Science Direct may indicate review articles.

10  □   Adaptive evolution in invasive species  [Review Article]  NOT a primary research article.
  *Trends in Plant Science, Volume 13, Issue 6, June 2008, Pages 288-294*
  Peter J. Prentis, John R. U. Wilson, Eleanor E. Dormontt, David M. Richardson, Andrew J. Low
  - Show preview  |  PDF (391 K)  |  Related articles  |  Related reference work articles

11  □   Natural products in crop protection  [Original Research Article]  A primary research article.
  *Biorganic & Medicinal Chemistry, Volume 11, Issue 12, 15 June 2009, Pages 4022-4034*
  Franck E. Dayan, Charles L. Cantrell, Stephen O. Duke
  - Show preview  |  PDF (420 K)  |  Related articles  |  Related reference work articles

- Journals may highlight review articles. **Look for a header on the first page** of the article.
Sometimes the article title contains the word review:

A review of the biology and ecology of three invasive perennials in New York State: Japanese knotweed (Polygonum cuspidatum), mugwort (Artemisia vulgaris) and pale swallow-wort (Vincetoxicum rossicum)

Leslie A. Weston, Jacob N. Barney & Antonio DiTommaso

Received 13 December 2004, Accepted in revised form 1 March 2005

Sometimes the abstract or summary mentions that the article is a review:

Summary

Interactions between plants and soil biota resist invasion by some nonnative plants and facilitate others. In this review, we organize research and ideas about the role of soil biota as drivers of invasion by nonnative plants and how soil biota may fit into hypotheses proposed for invasive success. For example, some invasive species benefit from being introduced into regions of the world where they encounter fewer soilborne pathogens than in their native range. Other invasive species may benefit from increased pathogen loads that allow soilborne pathogens to overcome host resistance mechanisms.

Sometimes the information is found in the introductory section

Evolutionary genetics of invasive species

Carol Eunmi Lee

The evolutionary genetics of invasive species has been relatively unexplored, but could offer insights into mechanisms of invasions. Recent studies suggest that the invasion success of many species might depend more heavily on their ability to respond to natural selection than on their physiological tolerance or plasticity. Thus, these studies stress the importance of genetic architecture, selection upon which could result in evolutionary adaptations and possibly speciation. For instance, epistatic interactions and the action of a few genes could facilitate invasion success. These findings emphasize the utility of incorporating evolutionary genetics into invasiveness assessments.

Identifying primary research and peer review articles gets easier with practice. If you have questions about an article, just ask.

Ask a Librarian