

Effective Scientific Writing and Publishing

Concepts, Misconceptions, and Techniques

Prof. **Mirza Hasanuzzaman**

mirzahasan.info.bd

Why Publishing Research Articles is Important?

Ideally it is

- To **communicate and share** the new discoveries in science
- Make contributions to society

More often is

- To be advance in the field
- To get the **research funding/grants**
- To get the tenure/**promotions**
- To improve the scientific **impact of institute/individual**
- Recognition by colleagues
- **Others...????**

Writing is a critical step in science although
scientists are not(?) trained to write.

Even very creative experiments and novel results
will have dull impact if the manuscript is not
written well.

Types of Publication

- Thesis
- Report
- Proceeding
- Journal article
- Research Reports
- Research Projects for Funding
- Patents



- Review articles
- **Monograph**
- Booklet
- **Book**
- **Book chapter**
- Case reports
- Editorials
- Book reviews
- Essays
- Letters to the editor

Before, During and After Research

- **Plan** before research
- Record sufficient data which can provide you a clear picture
- Record data in such way which can be analyzed smoothly
- Use proper design
- **Record data in MS Excel**

Writing papers is a skill

- Many papers are badly written
- Good writing is a skill you can learn

Attributes of a Good Manuscript

- Concise but powerful
- Story like
- To the point
- Free from grammatical and stylistic errors
- Recognizing contributions of others
- Technically correct

Searching Literature

- Citing good papers lead to good writing
- Search **quality database**
- Find institutional subscription
- Request your colleague
- Download full text from open access journals

Up-to-date reference is very much important.

In a recent report, Ali et al. (1971)....

Recently, Jony et al. (2024).....

Searching for the primary, secondary and tertiary sources

Using the library databases, there are three broad types of sources you need to search for: tertiary, secondary and primary sources.

1. Tertiary sources are **textbooks/reference books**.
2. Secondary sources are **review articles**.
3. Primary sources are the original accounts of the investigations, particularly **journal and conference papers**.

Choose the tentative topic headings for your review

- Methods for investigating
- Historical background
- Standard techniques
- Current technology

How to organize studies

- **Chronological**
 - By publication date
 - By trend
- **Thematic**
 - A structure which considers different themes
- **Methodological**
 - Focuses on the methods of the researcher, e.g., qualitative versus quantitative approaches

Structure of literature review chapter

General Introduction

2.1 Plant responses to drought

2.1.1 Growth

2.1.2 Physiology

2.1.3 Yield

2.2 Tolerance mechanisms

2.2.1 Changing morphology

2.2.2 Stomatal regulation

2.2.3 Water use efficiency

2.2.4 Osmolyte synthesis

2.3 Use of plant hormones

2.3.1 General functions of phytohormones in plants

2.3.2 Phytohormone in enhancing antioxidant defense

2.3.3 Molecular interactions

On the basis of topic

2.2.4 Nutrient use

Higher total nutrient uptake by intercrops than by sole crop has been reported by several authors: for example, nitrogen (John 1997), Potassium (Hall, 1999a, b), and magnesium and calcium (Singh, 2001) all show the effect. Differences in total yield by intercrops has been explained by this greater uptake, although it is difficult to know if this is the cause or the effect of greater dry matter production (Richardson, 1999). Contrasting results were also reported by Baker and Blamey (1985), who found less N uptake by sorghum-soybean intercrop compared to the sole crop sorghum; intercropping still produced significantly higher yields than the sole cropping.

Making links between studies

Agreements

- *Similarly*, author B points to...
- *Likewise*, author C makes the case that...
- Author D *also* makes this point...
- *Again*, it is possible to see how author E agrees with author D...

Disagreements

- *However*, author B points to...
- *On the other hand*, author C makes the case that...
- *Conversely*, Author D argues...
- *Nevertheless*, what author E suggests...

Density of N₂-fixing BGA in rice soils (CFU g⁻¹ dry soil)

Country	Sample No.	Min	Max	Mean	Reference
Bangladesh	6	2x10 ³	3x10 ⁴	2.2x10 ⁴	Bhuiya et al. (2015)
Philippines	61	3x10 ²	3x10 ⁵	2.6x10 ⁴	Garcia et al. (2013)
Thailand	40	1.1x10 ¹	5.2x10 ⁴	n.i.	Tanhcham (2016)
India	16	6.3x10 ³	4.1x10 ⁶	7.6x10 ⁵	Roger (2014)
Combodia	n.i	1x10 ⁵	1x10 ⁶	n.i.	Suzuki and Kaway (2013)

n.i.=Not indicated

Active or passive voice?

- You should use, where appropriate, both active and passive voice.
- As a general rule, use active voice unless there is good reason not to.

A Good Literature Review is:

- **Focused** - You should only present ideas and only report on studies that are closely related to topic.
- **Concise** - Ideas should be presented economically. Don't take any more space than you need to present your ideas.
- **Logical** - The flow within and among paragraphs should be a smooth, logical progression from one idea to the next
- **Developed** - Don't leave the story half told.
- **Integrative** - Your paper should stress how the ideas in the studies are related. How are some studies different than others? Your paper should stress **how all the studies reviewed contribute to your topic.**
- **Current** - Your review should focus on work being done on the cutting edge of your topic.

Common errors in reviewing literature

- **Hurrying** through review to get started could mean that you will miss something that will improve your research.
- Relying too heavily upon **secondary sources**.
- Overlooking sources other than academic journals. Don't forget newspaper articles, magazines, blogs, etc. [Not applicable for applied science]
- **Searching too broad or too narrow of a topic.**
- Inaccuracy in the compiling of **bibliographic information**.

Checklist for a Literature Review

- ✓ Does your review show the issues that have been dealt with in the past?
- ✓ Does it show the issues that are being and need to be currently addressed?
- ✓ Does it cite the key reviews on the subject? The KEY papers? The more FRINGE papers?
- ✓ Does it show the correlations, contradictions, ambiguities and gaps in the knowledge?
- ✓ Does it show the conflicts between competing research groups?
- ✓ Does it give an analysis and commentary that makes it clear that you understand the issues?
- ✓ Does it avoid giving just an account of who did what and when?



Overarching Questions:

Why am I writing this? (What's your **purpose**?)

For whom am I writing this? (Who is your **audience**?)

prewrite → **draft** **revise** → edit → publish

THINK!

Focus on ideas

some tools:

- brainstorming
- gathering info
- making an idea web
- free writing
- using a graphic organizer
- creating an outline

Cycle of writing, getting feedback & rewriting

- clarify main ideas
- support with details & examples
- make it **flow**
 - organization
 - sentence structure
- use great language

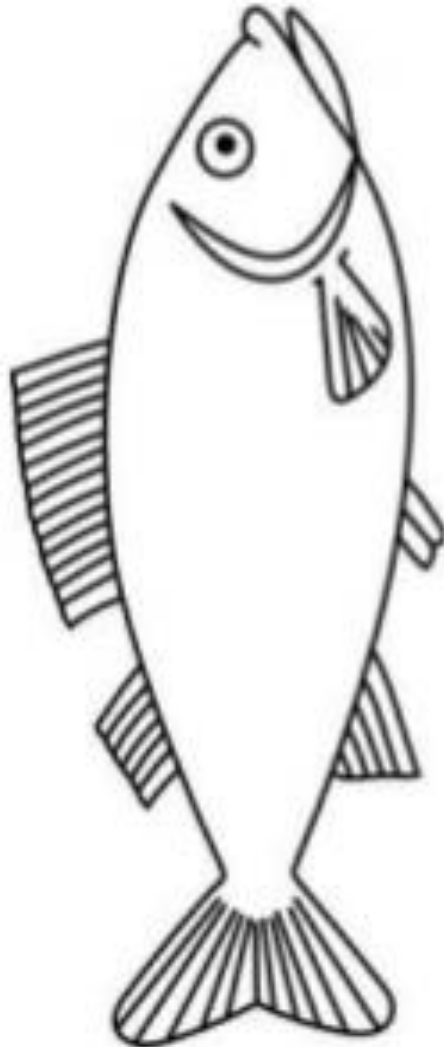
Correct the writing

- spelling
- grammar
- punctuation
- capitalization

Format the writing

- finished product

General Structures of Research Articles



- Title
- Abstract
- Keywords

Make them easy for indexing and searching! (informative, attractive, effective)

- Main text (IMRAD)**
- Introduction
- Methods
- Results
- And
- Discussions

**Journal space is not unlimited, more importantly, your reader's time is scarce.
Make your article as concise as possible.**

- Conclusion
- Acknowledgement
- References
- Supplementary Data

Part of a paper

Experimental process

What did I do in a nutshell?

What is the problem?

How did I solve the problem?

What did I find out?

What does it mean?

Who helped me out?

Whose work did I refer to?

Extra Information

Section of Paper

[Abstract](#)

[Introduction](#)

[Materials and Methods](#)

[Results](#)

[Discussion](#)

[Acknowledgments](#) (optional)

References

[Appendices](#) (optional)

The Front Matter

- Title
- Authors
- Abstract
- Keywords

The image shows a screenshot of a journal article's front matter page. Callout boxes on the left point to specific elements: 'Journal name' points to 'AUSTRALIAN SOCIAL WORK'; 'Year' points to '2018'; 'DOI' points to the URL 'https://doi.org/10.1080/0312407X.2018.1492622'; 'Article title' points to 'Postdisaster Counselling: Personal, Professional, and Ethical Issues'; and 'Authors' points to 'Lesley Cooper^a, Lynne Briggs^b, and Susan Bagshaw^c'. The page includes the Routledge logo and Taylor & Francis Group name in the top right, a 'Check for updates' button, and sections for 'ABSTRACT', 'ARTICLE HISTORY', and 'KEYWORDS' at the bottom.

Journal name: AUSTRALIAN SOCIAL WORK

Year: 2018

DOI: <https://doi.org/10.1080/0312407X.2018.1492622>

Volume, Issue and page details: 2018, VOL. 71, NO. 4, 430-443

Routledge Taylor & Francis Group

Check for updates

Article title: **Postdisaster Counselling: Personal, Professional, and Ethical Issues**

Authors: Lesley Cooper^a, Lynne Briggs^b, and Susan Bagshaw^c

^aSchool of Health and Society, Faculty of Social Science, University of Wollongong, NSW, Australia; ^bSchool of Human Services and Social Work, Griffith University, Southport, Queensland, Australia; ^cChristchurch School of Medicine, University of Otago, Christchurch, New Zealand

ABSTRACT
Volunteer counsellors face particular challenges in postdisaster interventions. This research investigates personal, professional, and ethical issues faced by mental health volunteer counsellors recruited to a counselling service that emerged following the 2011 earthquakes in the Canterbury region of New Zealand. Earthquakes create major community disruption that can overwhelm existing service systems and require new agency arrangements and increased use of volunteers to manage and

ARTICLE HISTORY
Received 17 April 2017
Accepted 7 June 2018

KEYWORDS
Natural Disasters;
Earthquakes; Counselling;
Volunteers

Title

The fewest possible words that adequately indicate the contents of the paper

Important in literature searching

Should not include extra words, such as “a study of”

Should be specific enough but not narrow

Title: Example

Original Title

Preliminary observations on the effect of Zn element on anticorrosion of zinc plating layer

Action of antibiotics on bacteria

Revised

Effect of Zn on anticorrosion of zinc plating layer

Inhibition of growth of mycobacterium tuberculosis by streptomycin

Remarks

Long title distracts readers. Remove all redundancies such as “observations on”, “the nature of”, etc.

Titles should be specific. Think to yourself: “How will I search for this piece of information?” when you design the title.

Abstract

- Summarizes the paper
- Widely read and therefore important
- Commonly organized in IMRaD format (may be **structured** abstract, with headings corresponding to the various sections)
- Content must be consistent with that in the paper
- Normally **should not** include figures, tables, references

Keywords



Keywords are a tool to help indexers and search engines find relevant papers. If database search engines can find your journal manuscript, readers will be able to find it too.



This will increase the number of people reading your manuscript, and likely lead to more citations.



Be **specific** to your field or sub-field

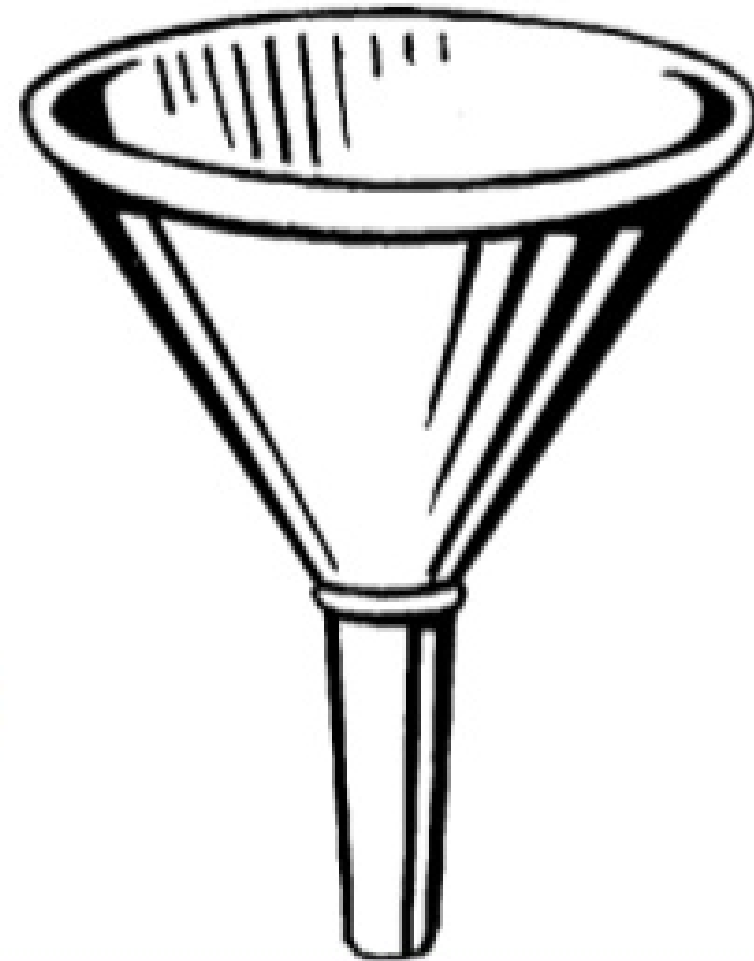
Introduction

- Provides background needed to understand the paper and appreciate its importance
- Identifies the question the research addressed
- In general, should be fairly short
- Typically, should be funnel-shaped, moving from general to specific.
- Tables and Figures?

The place to convince readers that you know why your work is relevant, also for them

Answer a series of questions:

- What is the problem?
- Are there any?
- Which one is the best?
- What is its main limitation?
- What do you hope to achieve?



General



Specific

Materials and Methods

This section provides the reader with all the details of how you conducted your study. You should:

- Use **subheadings** to separate different methodologies
- Describe what you did in the **past tense**
- Describe new methods in enough detail that another researcher can reproduce your experiment
- Describe **established methods briefly, and simply cite** a reference where readers can find more detail
- State **all statistical tests and parameters**

Include all important details so that the reader can repeat the work.

- Details that were previously published can be omitted but a general summary of those experiments should be included
- Give vendor names (and addresses) of equipment etc. used**
- All chemicals must be identified**
- Do not use proprietary, unidentifiable compounds without description
- Present proper control experiments**
- Avoid adding comments and discussion.**
- Write in the past tense**
- Most journals prefer the passive voice, some the active.
- Consider use of Supplementary Materials**
- Documents, spreadsheets, audio, video,

Reviewers will criticize incomplete or incorrect descriptions, and may even recommend rejection

Results

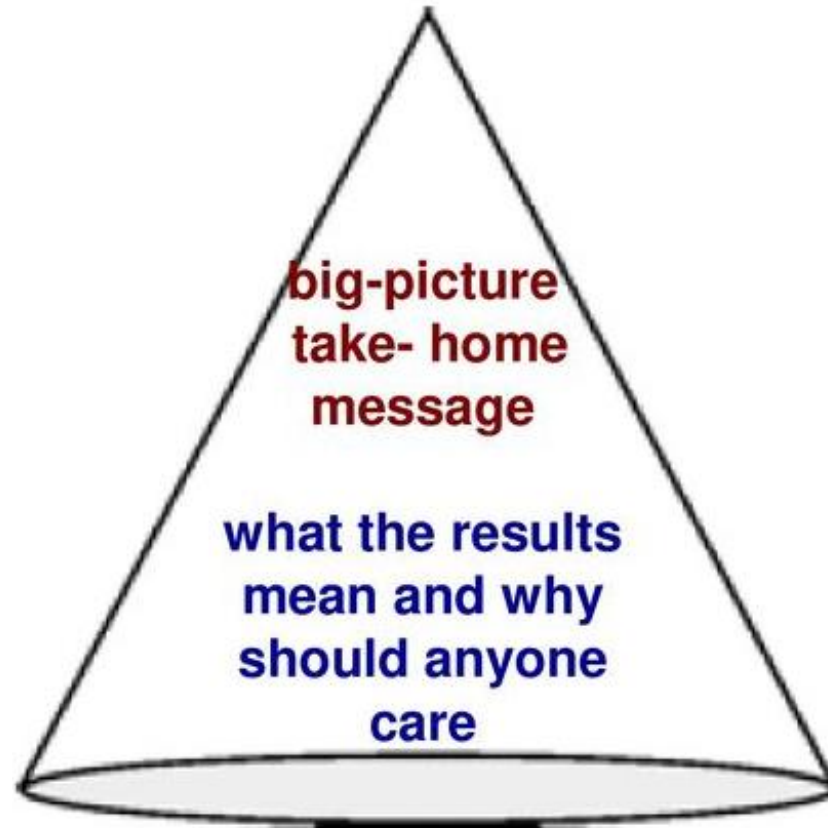
In the Results section, state what you found, but **do not interpret the results or discuss** their implications. Just state the results.

- Use the **past tense** to describe your results; however, refer to figures and tables in the present tense.
- **Do not duplicate data among figures, tables, and text.**
- Include **the results of statistical analyses** in the text, usually by providing ***p* values** wherever statistically significant differences are described.

Discussion – what the results mean

- Your Discussion section should answer the question:
What do your results mean?
- In other words, the majority of the Discussion section should be an **interpretation** of your results.

Typically, should move from specific to general (**opposite of introduction**)



- **Most challenging** to write.
- Should begin with a summary of the main findings.
- Should answer the question stated in the introduction.
- Defend the conclusion (your data, others' data).

Some other items commonly addressed:

- Limitations of the study
- Relationship to findings of other research works
- **Further research needed**

Conclusion

- State the most important outcome your work.
- Show what your findings mean to the readers.
- **Do not simply summarize the points (Abstract).**
- Focus on what you have found and, especially, on what your findings mean. show to what extent, you have succeeded in addressing the need stated in the Introduction.
- You can include **perspectives** at the end of the conclusion.
- **Avoid judgement about impact.**

Tables

The following is an example of a well-designed table:

- Clear and concise heading
- Data divided into categories for clarity
- Sufficient spacing between columns and rows
- Units are provided
- Font type and size are legible

Checking Tables

- Units are given in the column headings for all columns that require units
- Numerical data are presented accurately
 - When dealing with large quantities, consider using exponents in the column headings
- Table formatting meets journal requirements
 - Usually only three horizontal lines (above and below the column headings, below the table) and **no vertical lines**
- Footnotes, if used, are correctly linked to the appropriate parts of the table
- The table is descriptive enough to be understandable without the text

Figures

Figures are ideal for presenting:

- Images
- Graphs
- Data plots
- Maps
- Schematics

- **Clarity:** Make sure that all the parts of the figure are clear and legible at the figure size you have used
- **Completeness:**
 - Label the important parts of schematic diagrams
 - Insert scale in images and maps
- **Formatting:** Check journal instructions
 - Resolution of images/photographs (usually given in “dpi”)
 - Size limitations

Parts of a Graph

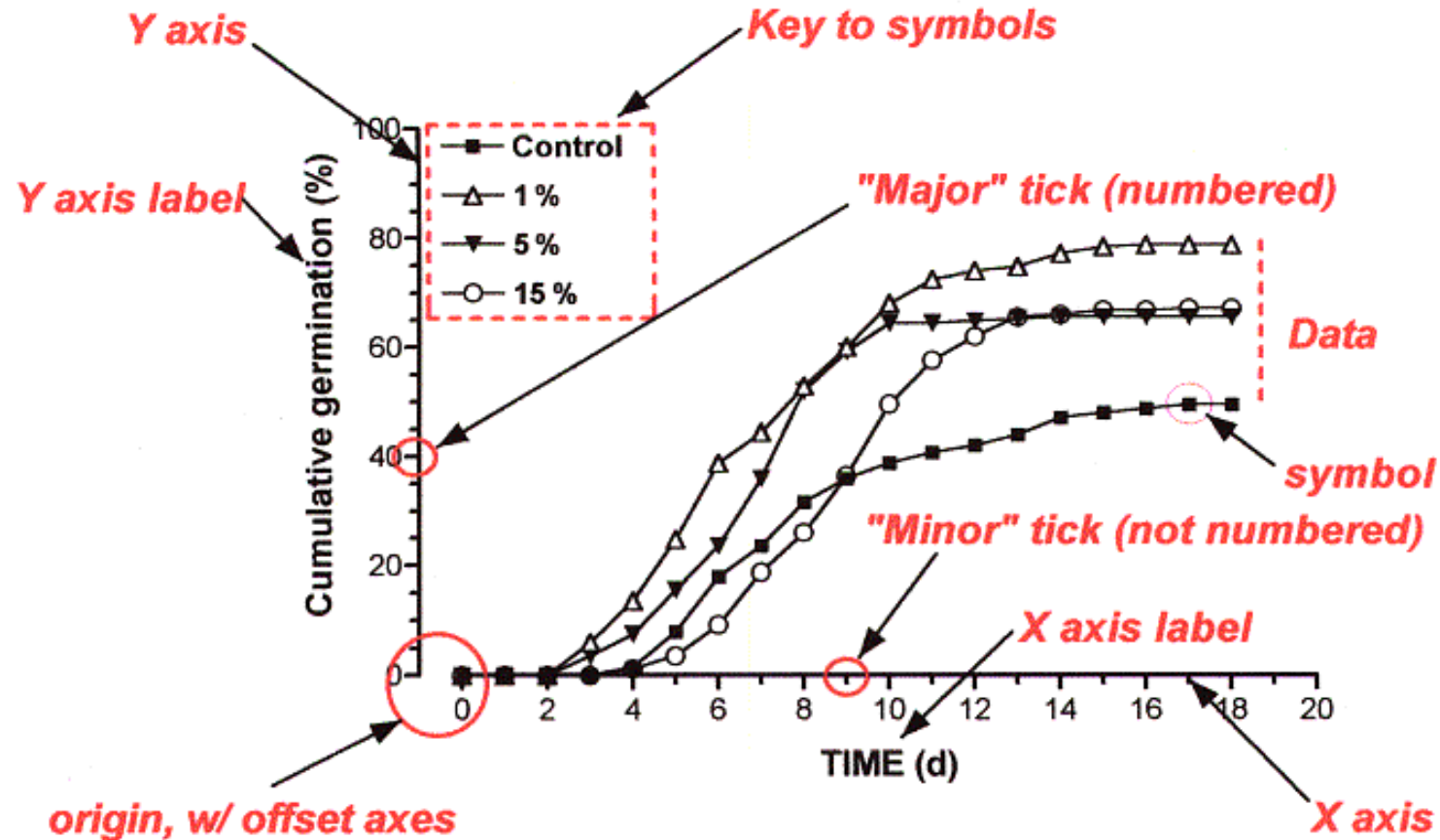


Figure 1. Cumulative percent germination of *Chenopodium* seeds after pregermination treatment of 2 day soak in NaCl solutions. All NaCl pretreatments increased the overall germination rate over the control (2 day soak in tapwater) and moved up the onset of germination by approximately two days at concentrations of 1 and 5%.

Figure Legends

- Must accompany Figures.
- Should give pertinent, clarifying information
 - key to abbreviations
 - sample size
 - statistical results
 - a brief description of how the data were acquired
- Should allow Table/Figure to **stand alone**

End Matter

- Acknowledgments
- References

Acknowledgments

- A place to thank people who helped with the work but did not make contributions deserving authorship
- Permission should be obtained from people you wish to list
- Sometimes the place where sources of financial support are stated

References

- Establish where ideas came from
- Give evidence for claims
- Connect readers to another research
- Provide a context for your work
- Show that there is interest in this field of research
- *Be sure to cite publications whose results disagree with yours.*

Journal Abbreviations

- Follow [standard](#) abbreviations.
- This is important
- Follow ISI rule

Process Engineering Journal

Environmental and Experimental Botany

Ecotoxicology and Environmental Safety

Fisheries Science

European Journal of Pharmacology

Plant Physiology and Biochemistry

Biochemistry

Typical length of a full article

- Not the same for all journals, even in the same field
- "...25- 30 pages is the ideal length for a submitted manuscript, including *ESSENTIAL data only.*"

- Title page
- Abstract 1 paragraph
- Introduction 1.5-2 manuscript pages (double-spaced, 12pt)
- Methods 2-4 manuscript pages
- Results & Discussion 10-12 manuscript pages
- Conclusions 1-2 manuscript pages
- Figures 6-8
- Tables 1-3
- References 20-50



Letters or short communications usually have a stricter size limitation, e.g. 3,000 words and no more than 5 figures/tables.

Words and expressions to avoid

Jargon

a considerable amount of

on account of

a number of

Referred to as

In a number of cases

Has the capacity to

It is clear that

It is apparent that

Employ

Fabricate

Preferred use

much

because

several

called

some

can

clearly

apparently

use

make

Word Choice

Bloom's Taxonomy

Knowledge: Recitation of fact

Found, identified, labeled

Comprehension: State a problem or interpret fact

Discuss, predict, compare

Application: Apply old information to solve new problems

Solve, show, examine, classify

Analysis: Used to explain patterns or meaning

Analyze, investigate, compare, contrast

Synthesis: Making predictions or discussing possibilities

Predict, plan, devise, propose

Evaluation: Drawing conclusions, making recommendations

Justify, verify, argue, recommend, determine

Journal Selection

- The aims and scope of the journal
- The audience for the journal
- Indexing
- Journal impact
- Time to publication
- Page charges or open access costs

What is International Journals?

The van Wingerden criteria for an International journal:

1. one-quarter (25%) of the editorial board/ associate or assistant editors reside/ are employed outside the country of publication.
2. > one-third (33%) of the total number of papers published originate from outside the country of publication.
3. > half (50%) the total number of subscriptions originates from institutions or individuals outside the country of publication.

...there are some arguments too.

Process of Research and its Publication

