

Scientific Writing & Publishing



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 “Navigating Women’s Careers in Higher Education- DIES Workshop on Gender Equity”
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Scientific Writing & Publication

- **Section I: Overview - Scientific writing Process**
 - Why publish?
 - Avenues for communicating in Science
 - Barriers to Publishing
 - Choosing a Journal
- **Section II: Scientific Writing - Manuscripts**
 - Organization and content of manuscripts
 - Writing a research paper
- **Section III: The Publication Process**
 - Publication and Peer Review
 - Ethics

Overview of Scientific process and writing

Section I

Why publish?

- **Advance knowledge**
- **Support your career**
- **Satisfy a donor**
- **Become famous**



...but most importantly:
Stay “alive” as a scientist

→ **Communicate with fellow scientists !!!**

Another Reason why

Problem/Question

Formulate a Hypothesis

Collect and Analyze Results

Your research is not complete

Observation/Research

Experiment

Conclusion, Inferences & Recommendations

Communicate the Results via Journals, Reports and Presentations

Avenues for communication in science

Aim: deliver information on research and results.

- Recognize different ways of communication
- Choose the most suitable way
- Adjust writing/presentation style accordingly

Poster at scientific meeting vs. public awareness event

Oral presentation at scientific meeting vs. public event

Research journals (papers vs. short communication)

Research reviews

Conference papers

Theses

Book chapters

Popular communications and extension manuals

Avenues for communication in science

Which avenue to choose?
Who is your target group?

Poster at public awareness event

Two types of viewers: Interested vs. casual listener

- Keep message simple, visual
- **Attract attention!**

Oral presentation at scientific meeting

Two types of audience: Specialist vs. casual listener

- Attractive presentation. Put your name on every slide,
- Attract attention (talk clear and loud, occasional jokes)
- and audio-visual help

Avenues for Communication in Science

Oral presentation at public awareness event
Attract with catchy title and audio-visual supports

Research journals:

Communicate new and original information to fellow scientists.

Short Communication

Communicate new and original information to fellow scientists in a condensed form (e.g. preliminary results of promising developing field of science).

Avenues for Communication in Science

Research reviews

- **Gathering all important work on a topic**
- **Not simply cataloguing of facts but rather: analyse, synthesize and interpret existing, facts**

Conference papers

- **Short by necessity**
- **Confined to Objectives, Methods, Key Results, Conclusion,**
- **Interpretation may be preliminary**

Avenues for Communication in Science

Thesis

- **Written evidence of sustained research effort**
- **Much longer than the other avenues of communication**
- **Includes extensive review of the literature**
- **Results of several experiments aimed at testing a single hypothesis**

Book chapters

- **Synthesize information about a particular subject**
- **Rarely sets out a fundamental hypothesis**

Avenues of Communication in Science

Extension manuals – dissemination of information to a practical oriented audience

In Summary

- **Research communications have different intents.**
- **The packaging of the content is crucial to the kind of audience.**

If target person cannot understand the message, all the effect of the work is lost!



What stands in the way of us
Publishing?

Discussion

Choosing a journal

Select the journal, which is read by the audience you want to reach

Example:

you have written a paper on the effects of N fertilizer application on maize

- **Euphytica** (Biodiversity, genetic resources)
- **Plant Biology** (Basic sciences in biology)
- **Planta** (Biotechnology and molecular biology)
- **Plant Physiology** (Basic physiology and molecular biology)
- **J. Plant Physiology** (Basic research on plant physiology)
- **J. Experimental Botany** (Basic/applied botany & stress physiology)
- **Plant and Soil** (Applied plant physiology)
- **Agronomy Journal** (Applied experimental field research)
- **Biol. Fertility of Soils** (Soil fertility-related studies)
- **Nutrient Cycling in Agroecosystems** (Applied ecological studies in agriculture)
- **Field Crops Research** (Field experiments with crops)
- **Agriculture, Ecosystems, Environments** (Field experiments with modelling)
- **Agricultural Systems** (Modelling)

Choosing a journal

Evaluate the journal's policy, scope and contents

- **Scope**
- **Impact Factor**
- **Frequency**
- **Submission Conditions**

Journal choice will influence format and style of your article

- **Journal style**

Journals receive more articles than they can publish

- **Best journals have high rejection rate**

Regional vs. international journal / Prestigious vs. less prestigious

- **Number of readers, fame & glory, input requirements, rapidity of appearance**

How can we increase the Number and Quality of our Publications

Discussion

Writing Scientific Manuscripts

Section II



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Part of experimental process	Section of the paper
What I did in a "nutshell" (in brief)	Abstract
What is the problem?	Introduction
How did I solve the problem?	Materials and Methods
What did I find out?	Results
What does it mean?	Discussion
Who helped me?	Acknowledgements
Whose work did I refer to?	Literature Cited

Manuscript Structure

Title

Authors Affiliation/ Abstract

Introduction

Materials and Methods

Results

Discussion and Conclusion

Acknowledgement

References

Tables and Figures

Which section of the Manuscript do you find the most difficult to write?

Title 

Should be brief: as few words as possible (<20) and informative

- Describe contents accurately (Comprehensive)
- Easy to understand

Examples

- **Breeding rice for grain quality in Ghana: genetic studies of physical, eating and cooking traits**
- Options for support to agriculture and food security under climate change
- **Adolescent girls and young women: key populations for HIV epidemic control**

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A Strong Title Orients Readers To Your Area Of Work

Effects of Humidity on the Growth of Yam

?

→

Effects of Humidity on the Growth and Yield of Yam in The Northern Regions of Ghana

21

Title Cont'd

Organic matter for sustainable agriculture in the tropics

Studies on the effects of *Azolla pinata* and *Azolla carolingiana* green manure on the mineralization and co-metabolization of Propanil and Alachlor in a flooded Tropaqueut under *Oryza sativa* L. - *Triticum aestivum* L. rotation in Khurajit village of Bangladesh.

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green manure on the mineralization and co-metabolization of the herbicides Propanil and Alachlor in a flooded rice soil.....

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Title Cont'd

	What	Why	Object 1	Object 2	Where
General	Org. matter	Sustainability	-- System/crop	----- Environment	- - - - - Area
	N ₂ fixation	Soil health	Rice-Wheat	Soil	Asia
	Green manure	Agro-chemicals	Rice	Flooded soil	South Asia
	Azolla	Pesticides	Lowland rice	Inceptisol	Bangladesh
	<i>A. pinata</i>	Herbicides	<i>Oryza sativa</i>	Tropaqueut	N-Bangladesh
Specific	<i>A. carolingiana</i>	Mineralization	<i>Triticum aestivum</i>		Khurajit
		Propanil/Alachlor			

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green manure on the mineralization and co-metabolization of the herbicides propanil and alachlor in a flooded rice soil.....

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Title Cont'd

	What	Why	Object 1	Object 2	Where
General	Org. matter	Sustainability	-- System/crop	----- Soil	- - - - - Area
	N ₂ fixation	Soil health	Rice-Wheat	Soil	Asia
	Green manure	Agro-chemicals	Lowland rice	Flooded soil	South Asia
	Azolla	Pesticides	<i>Oryza sativa</i>	Inceptisol	Bangladesh
	<i>A. pinata</i>	Herbicides	<i>Triticum aestivum</i>	Tropaqueut	N-Bangladesh
Specific	<i>A. carolingiana</i>	Mineralization			Khurajit
		Propanil/Alachlor			

Select key words for title

- As general as possible
- As specific as required

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Title Cont'd

	What	Why	Object 1	Object 2	Where
General	Org. matter	Sustainability	-- System/crop	Soil	-----Area
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	Green manure	Agro-chemicals	Lowland rice	Flooded soil	South Asia
	Azolla	Herbicides	Oryza sativa	Inceptisol	Bangladesh
	A. pinata	Mineralization	Triticum aestivum	Tropaquept	N-Bangladesh
Specific	A. caralingiana	Propanil/Alachlor			Khurajit

Select key words for title

- As general as possible
- As specific as required

25

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	What	Why	Object 1	Object 2	Where
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	A. pinata	Mineralization	Triticum aestivum	Tropaquept	N-Bangladesh
Specific	A. caralingiana	Propanil/Alachlor			Khurajit

Select key words for title

- As general as possible
- As specific as required

26

Title Cont'd

	What	Why	Object 1	Object 2	Where
General	Org. matter	Sustainability	-- System/crop	Soil	-----Area
	N ₂ fixation	Soil health	Rice-Wheat	Soil	Asia
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Specific	A. caralingiana	Propanil/Alachlor			Khurajit

Select key words for title

- As general as possible
- As specific as required

27

Title Cont'd

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Select key words for title

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- As specific as required

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Specific	A. caralingiana	Propanil/Alachlor			Khurajit

Select key words for title

→ As general as possible

→ As specific as required

Effect of azolla on the mineralization of herbicides in a flooded rice soil of Bangladesh

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Manuscript Structure

- Title
- Authors, Affiliation & Abstract
- Introduction
- Materials and Methods
- Results
- Discussion and Conclusion
- References
- Tables and Figures

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Authors and affiliation

Authors name and affiliation:

- Complete for proper identification
- Full names to avoid confusion
- Include only people who are authors
- List in logical order (contribution, alphabetical)
- Addresses for future correspondence

Title
Authors
Affiliation
Abstract Key words

How the characteristics of innovations impact their adoption: An exploration of climate-smart agricultural innovations in South Africa

Mmapatla Precious Senyolo ^{a,b}, Thomas B. Long ^{a,c}, Vincent Blok ^d, Onno Omta ^e

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^b University of Limpopo, Department of Agricultural Economics, School of Agricultural and Environmental Sciences, Private Bag X1106, Sovenga, 0727, South Africa

How the characteristics of innovations impact their adoption: An exploration of climate-smart agricultural innovations in South Africa

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ARTICLE INFO **ABSTRACT**

Article history:
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Keywords:
 Climate-smart agriculture
 Technological innovations
 Adoption
 Farmers
 Agriculture
 South Africa

Climate change threatens agricultural production and the food security of developing countries in complex ways that demand environmentally friendly innovations. Climate-smart agriculture provides a response to climate change whilst enhancing livelihood of farmers. Climate-smart agricultural technological innovations at farm level have the potential to address climate-related challenges. However, inadequate adoption of these technologies remains a problem. This paper identifies available climate-smart agricultural technological innovations in South Africa and explores their characteristics and context of use using an exploratory research approach. An overview of climate change risks and variability in South Africa and a framework to classify the technological innovations is established based on a literature review. Interviews with expert stakeholders are used to characterise and collect information on available technologies. Results indicate that Conservation Agriculture, Rainwater Harvesting and Seed Varieties that are Drought Tolerant and Early Maturing may be the most suited technologies for climate-smart agriculture in South Africa, particularly for smallholder farmers. However, high initial investment costs, additional labour requirements and management intensity associated with conservation agriculture and rainwater harvesting may pose problems within the South African context. Drought Tolerant and Early Maturing Seed Varieties were noted as less costly and less management intensive, creating better prospects for adoption. This study serves as an initial assessment through the exploration of the available climate-smart agricultural technologies in South Africa. This is essential given that the agricultural sector is faced with the dilemma of responding to climate change related challenges whilst increasing the productivity of farmers.

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Abstract Types

- Summary
- Technical Abstract
- Informative Abstract
- Abstract
- Descriptive Abstract
- Executive Summary

Abstract

- Summary of Manuscript (~300 Words)
 - Problem investigated
 - Subject
 - Purpose of Research
 - Materials, Methods and Treatment of data
 - Results or findings
 - Conclusion
 - Implications/applications

Clarity and conciseness are key here!

- No references to literature
- No abbreviations
- No references to Tables or Figures
- No conclusions that are not substantiated in paper

Abstract

- Short (150-300 words)
- Stands on its own (IMRAD)
- Contains words suitable for indexing
- Present findings as "hard facts"

ABSTRACT

Climate change threatens agricultural production and the food security of developing countries in complex ways that demand environmentally friendly innovations. Climate-smart agriculture provides a response to climate change whilst enhancing livelihood of farmers. Climate-smart agricultural technological innovations at farm level have the potential to address climate-related challenges. However, inadequate adoption of these technologies remains a problem. This paper identifies available climate-smart agricultural technological innovations in South Africa and explores their characteristics and context of use using an exploratory research approach. An overview of climate change risks and variability in South Africa and a framework to classify the technological innovations is established based on a literature review. Interviews with expert stakeholders are used to characterise and collect information on available technologies. Results indicate that Conservation Agriculture, Rainwater Harvesting and Seed Varieties that are Drought Tolerant and Early Maturing may be the most suited technologies for climate-smart agriculture in South Africa, particularly for smallholder farmers. However, high initial investment costs, additional labour requirements and management intensity associated with conservation agriculture and rainwater harvesting may pose problems within the South African context. Drought Tolerant and Early Maturing Seed Varieties were noted as less costly and less management intensive, creating better prospects for adoption. This study serves as an initial assessment through the exploration of the available climate-smart agricultural technologies in South Africa. This is essential given that the agricultural sector is faced with the dilemma of responding to climate change related challenges whilst increasing the productivity of farmers.

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Abstract – Exercise 1

Structure

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. caroliniana* as green manure on the mineralization and co-metabolization of the herbicides propanil and butachlor in a flooded rice soil (Tropaquet) on the experimental station of Khurajit. Incorporation of *Azolla* resulted in a co-mineralization of Propanil within a 3 week period but had no effect on Alachlor in the 3-month experimental period..... The use of *Azolla* green manure can help to avoid residual accumulation of some herbicides.

Abstract

Structure: 1. Background

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green manure on the mineralization and co-metabolization of the herbicides propanil and butachlor in a flooded rice soil (Tropaquept) on the experimental station of Khurajit.

Incorporation of Azolla resulted in a co-mineralization of Propanil within a 3 week period but had no effect on Alachlor in the 3-month experimental period

Azolla green manure use helps avoid residual accumulation of some herbicides.

Abstract

Structure: 1. Background; 2. Objectives

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites.

A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green manure on the mineralization and co-metabolization of the herbicides propanil and butachlor in a flooded rice soil (Tropaquept) on the experimental station of Khurajit.

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Azolla green manure use helps avoid residual accumulation of some herbicides.

Abstract

Structure: 1. Background; 2. Objectives; 3. Materials and Methods

Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green manure on the mineralization and co-metabolization of the herbicides propanil and butachlor in a flooded rice soil (Tropaquept) on the experimental station of Khurajit.

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Abstract

Structure: 1. Background; 2. Objectives; 3. Materials and Methods
4. Results

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Abstract

Structure: 1. Background; 2. Objectives; 3. Materials and Methods
4. Results; 5. Conclusion

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Incorporation of Azolla resulted in a co-mineralization of Propanil within a 3 week period but had no effect on Alachlor in the 3-month study period

We conclude that the use of azolla green manure can help to avoid residual accumulation of some herbicides.

Title

Title Effect of azolla on the mineralization of herbicides in a flooded rice soil of Bangladesh

Authors M. Mouse, D. Duck and D. Pluto*

Affiliation Walt Disney Institute, Duckhousen, Mickey Lane 13, FL, USA

* Corresponding author

Abstract Residual accumulation of herbicide residue threatens the sustainability of rice-wheat rotation systems in northern Bangladesh. The incorporation of green manure into the soil may stimulate the co-mineralization of pesticides and their metabolites. A two year field experiment was conducted on the experimental station of the Bangladesh Rice Research Institute to evaluate the effects of the application of *Azolla pinata* and *A. carolingiana* as green ...

Key words Alachlor, *Azolla pinnata*, *A. carolingiana*, Inceptisol, *Oryza sativa*, Propanil

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Abstract – Common Mistakes
<ul style="list-style-type: none"> • Too much background or information on the methods • Figures or images • References to other literature, • Abbreviations or acronyms

Manuscript Structure
Title
Authors, Affiliation & Abstract
Introduction
Materials and Methods
Results
Discussion and Conclusion
References
Tables and Figures

IMRAD Introduction

Introduction:

- Defines the problem (context, nature and extent)
- Tells why the reader should be interested
- Tells why the research was undertaken
- Provides a background - understand and judge a paper
- Relates your research to previous work (brief literature review)
- Sets a hypothesis (one!)
- Explains objectives (several)
- Defines specialized terms and abbreviations

Note: *Tell a story (general → specific)
Lead logically to hypothesis
State hypothesis clearly
Do all this in no more than two typewritten pages
End with objectives*

Introduction – Common Mistakes

- Too much or not enough information
- Unclear purpose
- Confusing structure
- First-Person anecdotes

Manuscript Structure

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References

Tables and Figures

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IMRAD Materials and Methods

Materials and Methods:

- Sufficiently detailed so that another researcher can repeat the experiment
- Site description (where and when, climatic conditions)
- Should include materials used with exact description (incl. origin, source, sampling frame)
- Materials with exact technical specifications (quantities, methods of preparation, supplier, etc.)
- Assumptions made

IMRAD Materials and Methods

Materials and Methods:

- Methods in chronological order
- Treatments, treatment applications and design
- Statistical methods used

Note

- all quantities in SI units
- all chemicals properly identified
- every step stated (incl. number of reps)
- all techniques described
- no unnecessary details that confuse the reader

Materials and Methods

Common Mistakes

- Too little information
- Information from Introduction
- Verbose
- Results/ sources of error reported

Manuscript Structure

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Results

Discussion and Conclusion

References

Tables and Figures

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IMRAD Results

This is the core of your paper presenting what you have found.
Present results in the same order that your objectives appear (Introduction).

Well presented results are:

- Simply and clearly stated
- Reduce data masses to means with standard errors or deviations
- Repeat in the text only the most important findings shown in the tables / graphs
- Include only data related to the subject and as defined in the introduction
- Refer to every table and figure, in the text, by number
- Include only tables and figures that are absolutely necessary, clear and worth reproducing
- avoid repetition of data
- avoid unnecessary negative data
- avoid unnecessary graphs or figures (repetition of tabulated info in graphs)
- avoid unnecessary words

Results – Common mistakes

- Raw data
- Redundancy
- Discussion and interpretation of data
- No figures or tables
- Methods/materials reported

Manuscript Structure

Title

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Introduction

Materials and Methods

Results

Discussion and Conclusion

References

Tables and Figures

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IMRAD and Discussion

Here you explain what the results mean and their implication ...
for future studies – for other areas/crops etc. – compared to published findings – regarding your hypothesis

This is the most difficult part. Pull everything together and show the significance of the work. The reader should not end up saying “so what?”.

A good discussion:

Does not repeat what has already been said in the introduction or results
Relates the results to the questions/hypotheses set out in the introduction
Shows how results and interpretations disagree with previous published work
Discusses theoretical implications
Indicates significance of results in a broader context (General Discussion)
States conclusions
Suggests future research

IMRAD and Discussion

Note:

- Deal with each originally stated objective following the order of your objectives as given at the end of the Introduction
- Make sure the subject of each conclusion has been introduced previously
- Avoid unnecessary detail and repetition
- Interpret the results and suggest their implications and significance

Conclusion

Analyze results and give a future perspective

Conclusions

Analysis of Results

Future Perspective

Analyze results from overall perspective

Several options:

- Make recommendations
- Discuss future work
- Repeat limitations

Manuscript Structure

Title

Authors, Affiliation & Abstract

Introduction

Materials and Methods

Results

Discussion and Conclusion

References

Tables and Figures

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References

- For format, consult "Instructions to Authors"
- Respect journal format requirements
- Reference list must include all in-text citations
- All references listed must be cited in the text
- List references in alphabetical order
- Use consistent formatting

THE A TO Z OF REFERENCING

HARVARD REFERENCING STYLE 01

APA REFERENCING STYLE 02

MLA REFERENCING STYLE 03

CHICAGO REFERENCING STYLE 04

References - Citations in the text:

One author:
A summary of green manure effects on soil parameters is presented by **Becker (1987)**
... of ...
Green manure effects on soil parameters have been summarized previously (**Becker, 1987**).

Two authors:
Mineral N affects the N_2 fixation more in stem-nodulating than in root-nodulating legumes (**Becker and George, 1993**).
... of ...
Becker and George (1993) could show that mineral N affects the N_2 fixation more in stem-nodulating than in root-nodulating legumes.

More than two authors:
Legume BNF has been shown to be related to plant P uptake (**Becker et al., 1989**).
... of ...
Becker et al. (1989) showed that legume BNF is related to plant P uptake.

References

Citations in the list:

Journal article:

- Author
- Year
- Title
- Name of Journal (see standard abbreviations)
- Journal volume
- Journal pages

Becker, M. (1987) *Aeschynomene* as green manure for rice (*Oryza sativa* L.). Z. Pflanzenernähr. Bodenkd. **16**:12-18.

Becker, M. and George, T. (1993) Differential response of legumes to soil flooding and combined nitrogen. Plant and Soil **161**: 56-62.

Becker, M., Dalton, T.J. and Johnson, D.E. (1999) Agronomic and economic evaluation of legume fallow for upland rice. Biol. Fertil. Soils **25**:256-262.

References

Citations in the list:

Book chapters:

- Author
- Year
- Title of chapter
- Page numbers
- Editors of book (ed. or eds.)
- Title of book
- Publisher
- City of publication

Becker, M. and Ladha, J.K. (1995) Synchronizing residue N release with rice N demand in flooded soils. pp. 264-271. In: Cadisch, G. and Giller, K. (eds.) *Driven by Nature*. CAB Publishers, Wellington, UK.

References

For format, consult "Instructions to Authors"

- Respect journal format requirements
- Reference list must include all work cited in the text
- All references listed must be cited in the text
- List references in alphabetical order
- Use consistent formatting
- Use a reference managing software



References – Identify the errors

- Author₁, X.Y., Author₂, X.Y. and Author₃, X.Y. YEAR. TITLE. J. #, 000-000.
- Becker, M., Ladha, J.K. and Ottow, J.C.G. 1994. Nitrogen losses and lowland rice yield as affected by residue N release. Soil Sci. Soc. Am. J. 58:1660-1665
 - Alazard, Didier and Becker, Mathias 1987. Aeschynornene as green mnaure for rice. Plant and Soil 101, 141-143.
 - Buresh, R. J. and De Datta, S. K. (1991) Nitrogen dynamics and management of rice-legume cropping systems. Adv. Agron. 45,1-59
 - Cassman, K.G.; C.G. Gines; M.A.Dizon; M.I. Samson, J.M. Alcantara 1996. Nitrogen use efficiency in tropical lowland rice systems. Field Crops Research 47, 1-12.
 - Ladha, J.K.; Pareek, R.P. and Becker, M. 1992. Stem-nodulating legume-Rhizobium symbiosis and its agronomic use in lowland rice. IRRI Saturday seminar paper.

14 errors !

References – Identify the errors

Author₁, X.Y., Author₂, X.Y. and Author₃, X.Y. YEAR. TITLE. J. #, 000-000.
Alphabetic order!

- Becker, M., Ladha, J.K. and Ottow, J.C.G. 1994. Nitrogen losses and lowland rice yield as affected by residue N release. Soil Sci. Soc. Am. J. 58:1660-1665.
- Alazard, D(idier). and Becker, M(athias). 1987. Aeschynornene as green mnaure for rice. Plant and Soil 101, 141-143.
- Buresh, R. J. and De Datta, S. K. (1991) Nitrogen dynamics and management of rice-legume cropping systems. Adv. Agron. 45,1-59.
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14 errors !

References - Common Mistakes

- **Format, Format, Format**
 - Type of Reference
- **Check specific referencing style of journal**
- **Should reference:**
 - Peer-reviewed journal articles, abstracts, books
- **Should not reference:**
 - Non-peer-reviewed works, personal communications

Manuscript Structure

Title



Abstract



Introduction



Materials and Methods



Results



Discussion and Conclusion



References



Tables and Figures



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Figures and Tables

- **A figure or table should be able to stand alone.** i.e. the reader should understand what was done and what was found without referring to the text.
- **Clear, informative titles** provide the reader with much of this information.
- **Within the text itself**, point out the interesting aspects of the data in the tables and figures.
- **Identify the most reader-friendly and data-appropriate manner** to present your data.

Parts of a Figure

Below is a typical line graph with the various component parts labeled (in red).

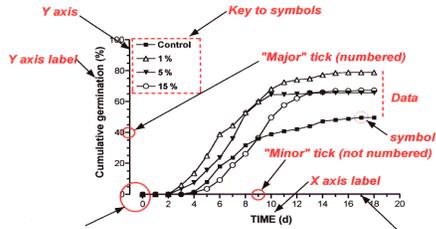


Figure 1. Cumulative percent germination of *Chenopodium* seeds after pregermination treatment of 2 day soak in NaCl solutions. All NaCl pretreatments increased the overall germination rate over the control (2 day soak in tapwater) and moved up the onset of germination by approximately two days at concentrations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

The Anatomy of a Table

Table 4. Population variation in hatch success (mean percent) of unfertilized eggs for females from populations sampled in 1997. N = number of females tested.

Population	mean (%)	Standard deviation	Range	N
Beaver Creek ^T	7.31	13.95	0-53.16	15
Honey Creek ^T	4.33	7.83	0-25.47	11
Rock Bridge Gans Creek ^T	5.66	13.93	0-77.86	38
Cedar Creek ^P	6.56	9.64	0-46.52	64
Grindstone Creek ^P	8.56	14.77	0-57.32	19
Jacks Fork River ^P	5.28	8.28	0-30.96	28
Meramec River ^P	5.49	10.25	0-45.76	45
Little Dixie Lake ^L	7.96	14.54	0-67.66	71
Little Prairie Lake ^L	6.86	7.84	0-32.40	36
Rocky Forks Lake ^L	3.51	4.12	0-16.14	43
Winegar Lake ^L	10.73	17.58	0-61.64	5
Whetstone Lake ^L	7.36	12.93	0-63.38	57

^T = temporary stream, ^P = permanent streams, ^L = lakes.
 ---Table legend
 ---Column titles
 ---Table body (data)
 ---Lines demarcating the different parts of the table

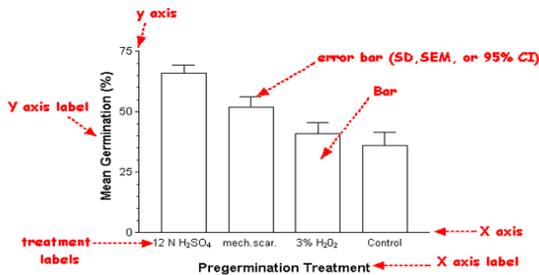
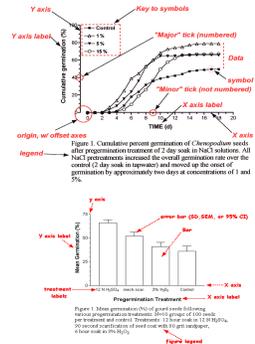


Figure 1. Mean germination (%) of gourd seeds following various pregermination treatments. N=10 groups of 100 seeds per treatment and control. Treatments: 12 hour soak in 12 N H₂SO₄, 90 second scarification of seed coat with 80 grit sandpaper, 6 hour soak in 3% H₂O₂.

Figures and Tables - Guidelines

- High resolution
- Neat, legible labels
- Simple
- Clearly formatted
- Indicate error
- Detailed captions



Placement of Figures & Tables within the Paper

- In manuscripts, Tables and Figures are usually put on separate pages from text material.
- Table or Figure are placed as close as possible to the place where they are first refer to (e.g., the next page).
- Figures and Tables may be embedded in the text,

Getting Started



Writing Stages

1. Getting in the Mood



2. Writing the First Draft



3. Revising, Revising, Revising



4. Finishing



80

Writing in spite of yourself



- Everyone writes but not all do it easily
- **Fear of writing** is very common
- Sometimes we do “top down” writing
- Take ownership of your research
- Writing is learned so study good articles
- There are techniques and rules to learn



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Hints for scientific writing

- Before you write a paper, read some!
- Choose the right journal
- Follow a logical order (IMRAD)
- Be clear, concise and complete
- Strive for accuracy
- Get to the point quickly and stick to it!
- Cite only references that are relevant and necessary
- Include only figures and tables that are necessary
- Use standard units and abbreviations, and be consistent
- Use a spell-checker !

How do you start get started?

Discussion

Writing a research paper

Come up with a plan for an article
 Review the raw material (**results**)
 Search the literature (**background, methods, similar topics**)
 Construct a skeleton (**table of contents**)

Title
 Affiliations
 Abstract
 Keywords
 Introduction (ending with objectives)
 Material and methods (sites, material, methods, treatment application, data analysis)

Results (in the order of objectives and treatment application)
Discussion (+conclusion and future research needs)
References (format, number, relevance)

Writing a research paper

Produce a preliminary draft

Materials and Methods
 (always get started with what you have done yourself. This is the easiest part!)

Results
 (this is also your own work)

Objectives
 (each objective is reflected in one result chapter)

Introduction and Discussion
 (This is the most difficult part).
 Write these two chapters “in parallel”. Make sure that the Objectives from “Introduction” are being addressed and discussed in the exact same order in “Discussion”.

Writing a research paper

Revise the first draft

- Are all parts properly described?
- Are there major changes needed?
- Is the logic sound?
- Is the order of presentation satisfactory?
- Can Tables / Figures be eliminated or combined?
- Are there enough / too many sub-headings?

3. Material and Methods

3.1 Plant material

3.1.1 Origin of plants

3.1.1.1 Rice

3.1.1.1.1 *Oryza glaberrima*

3.1.1.1.1 *O. glaberrima* from Guinea

Writing a research paper

Revise the first draft

- Are all parts properly described?
- Are there major changes needed?
- Is the logic sound?
- Is the order of presentation satisfactory?
- Can Tables / Figures be eliminated or combined?
- Are there enough / too many sub-headings?

Revise the second draft

- Check the references!
- Are there enough / too many references?
- Are all references listed?
- Are all abbreviations introduced?
- Are figures and tables properly labelled and numbered?
- Before submitting the MS, get the approval of all co-authors.

Publication & Peer Review



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Deciding to Publish and Submitting Your Paper

- **What to publish?**
 - abstract vs. full report
- **Choosing your forum**
 - Which type of journal is best for you?
 - What audience are you targeting?
- **Research the journal**
 - Publication guidelines
 - Article style

After Submission

• Publication Procedure (6-12 months)

- Author submits
- Editor is assigned to manuscript
- Editor assigns reviewers (associate editors) to inspect
- Reviewers decide on whether to review paper
- Several reviewers inspect and edit
- Editor decides on accuracy of revisions and whether to accept paper
- If accepted, editor sends paper back to author with revisions
- Author revises paper and sends it back
- Possibility of second review process
- Publication!

What is Peer Review?

- **Review process for scientists by scientists**
- **Purpose**
 - To filter what is published as “science”
 - To provide researchers with perspective
- **Where is peer review used?**
 - Scientific publication
 - Grant review
 - Tenure promotion

Scientific Misconduct

- Gift and Ghost Authorship
- Duplicate/Redundant Publication
- Plagiarism
- Fabrication
- Falsification
- Conflict of Interest



The most important ethical concept in scientific research and publishing is

Transparency

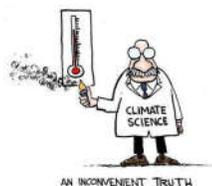
Telling the truth to the people who need to know it:

- Journal Editors
- Readers and Colleagues
- Funding Agencies

courtesy of Tom Lang

Falsification of Data

- Intentionally changing one or more values for data that have already been collected;
- Intentionally misrepresenting the actual data
- Often done because the results were not as good as expected or desired



courtesy of Tom Lang

Fabrication of Data

- Intentionally recording (or reporting) “made-up data” that were never collected
- Usually done because the authors believe they know what the results would be if they actually did the study.

courtesy of Tom Lang

Suppression of Data

- Intentionally withholding data from colleagues or publication
- Usually occurs when the results for a commercial product are unfavorable

courtesy of Tom Lang

What is plagiarism?

Plagiarism is the act of taking another person's writing, conversation, song, or even idea and passing it off as your own.

Information sources:

web pages, books, songs, television shows, email messages, interviews, articles, artworks or any other medium.

<http://www.lib.usm.edu/legacy/plag/whatisplag.php>

When do we plagiarize?

- “You quote, paraphrase, or summarize a source but fail to cite it.
- You use ideas or methods from a source but fail to cite it.
- You use the exact words of a source and you do cite it and do not put those words in quotation marks or blocks.
- Fail to properly quote, cite or acknowledge someone else's words or ideas within an **internal citation**.

Just a bibliography at the end of your paper is not enough.

Self-plagiarism is Still Plagiarism

- Don't copy blocks of text from an old publication into a new manuscript
- Many journals now use tools that detect this and other types of plagiarism



Rules to Live By - from Booth et al. 2008

- “Cite the source of every quotation, paraphrase or summary.”
- “Signal every quotation, even when you cite its source.”
- “Don't paraphrase too closely.”
- “Usually cite a source for ideas that are not your own.”
- “Don't plead ignorance, misunderstanding.”

Predatory Journals



SIGNS THAT A JOURNAL MAY BE PREDATORY

- Many are open access and require fees
- Quality is of substantial concern: poor or no editing and poor or no peer review
- Unethical business practices such as offering services not as advertised
- Making false claims about impact factors or indexing
- Failure to adhere to accepted standards of scholarly publishing
- Aggressive solicitation of manuscripts



Beall's List of Predatory Journals and Publishers - Publishers

<https://bluesyemre.com/2018/03/24/bealls-list-of-predatory-journals-and-publishers/>

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