Preparing your results for publication

Maximising your chances to get your manuscript rapidly accepted

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My credentials

- Most importantly: (co-)author of >300 papers
- On ISI's Highly Cited list since 2001
- Senior author of a textbook: *Plant Physiological Ecology* (2nd edition 2008)
- (Past) member of (Advisory) Editorial Boards, *e.g.*,
  - *Physiologia Plantarum*
  - *Plant, Cell & Environment*
  - *Functional Plant Biology*
  - *Tree Physiology*
- (Co-)editor of 10 books
- Editor-in-Chief of *Plant and Soil*
- Did I pass the test?

What to publish?

- Full-length articles are about 5,000 words: a series of experiments making a coherent story
- Short notes are about 200 words
- General rule: it is better to publish one solid paper than to split it into two or three short notes
- Articles in books and reports are less prestigious: publish your primary data in international journals

Where to publish?

- Carefully select the right journal
  - Who are on the Editorial Board?
  - From which journals do you cite papers in your reference list?
  - Which journals publish on a similar topic?
  - Beware of new journals with misleading names, such as “Australian …”, “American …”, “International…” coming from the subcontinent
- Final decision
  - Prestige ('impact factor')
  - Time to publish (check time between submission of the manuscript and publication)
  - Your experience with a specific journal (attitude of reviewers and editors)
  - Page charges
  - Charges for colour photos

What exactly is the 'Impact Factor' (IF)?

- Put simply: IF is a rough indicator for the quality of a journal in a narrowly defined discipline, *e.g.*,
  - Agriculture
  - Plant sciences
  - Molecular biology

- It is silly to compare impact factors between disciplines, *e.g.*, Ecology and Molecular Biology

The Impact Factor (IF) for 2009

Citations in 2009 to articles published in:

2008 = 270

2007 = 359

Sum: 629

Number of articles published in:

2008 =213

2007 =189

Sum: 402

Calculation:

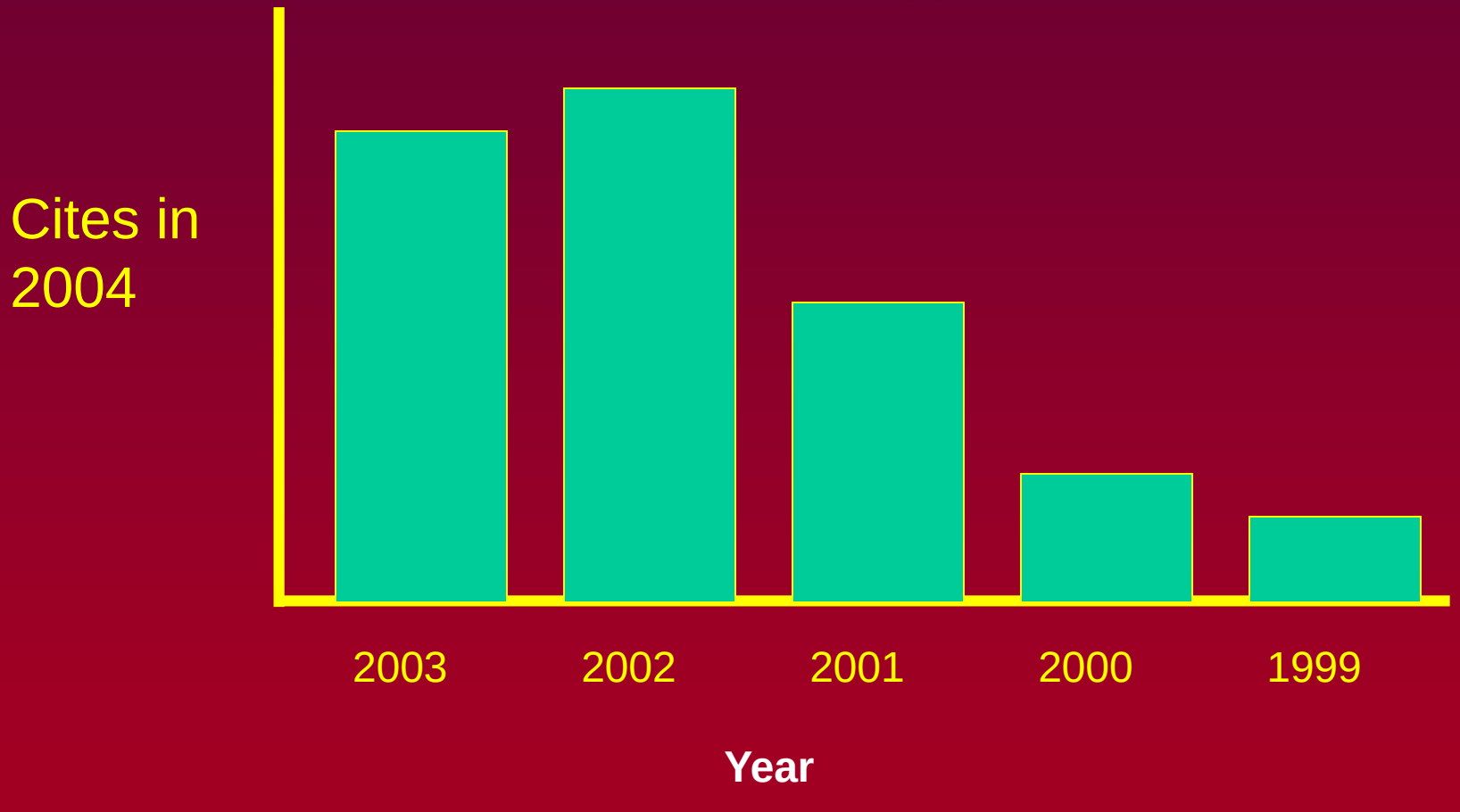
Citations to recent articles 629 / Number of recent articles 402 = **1.565**

The 5-year IF uses 5 years of citations and publications, rather than 2

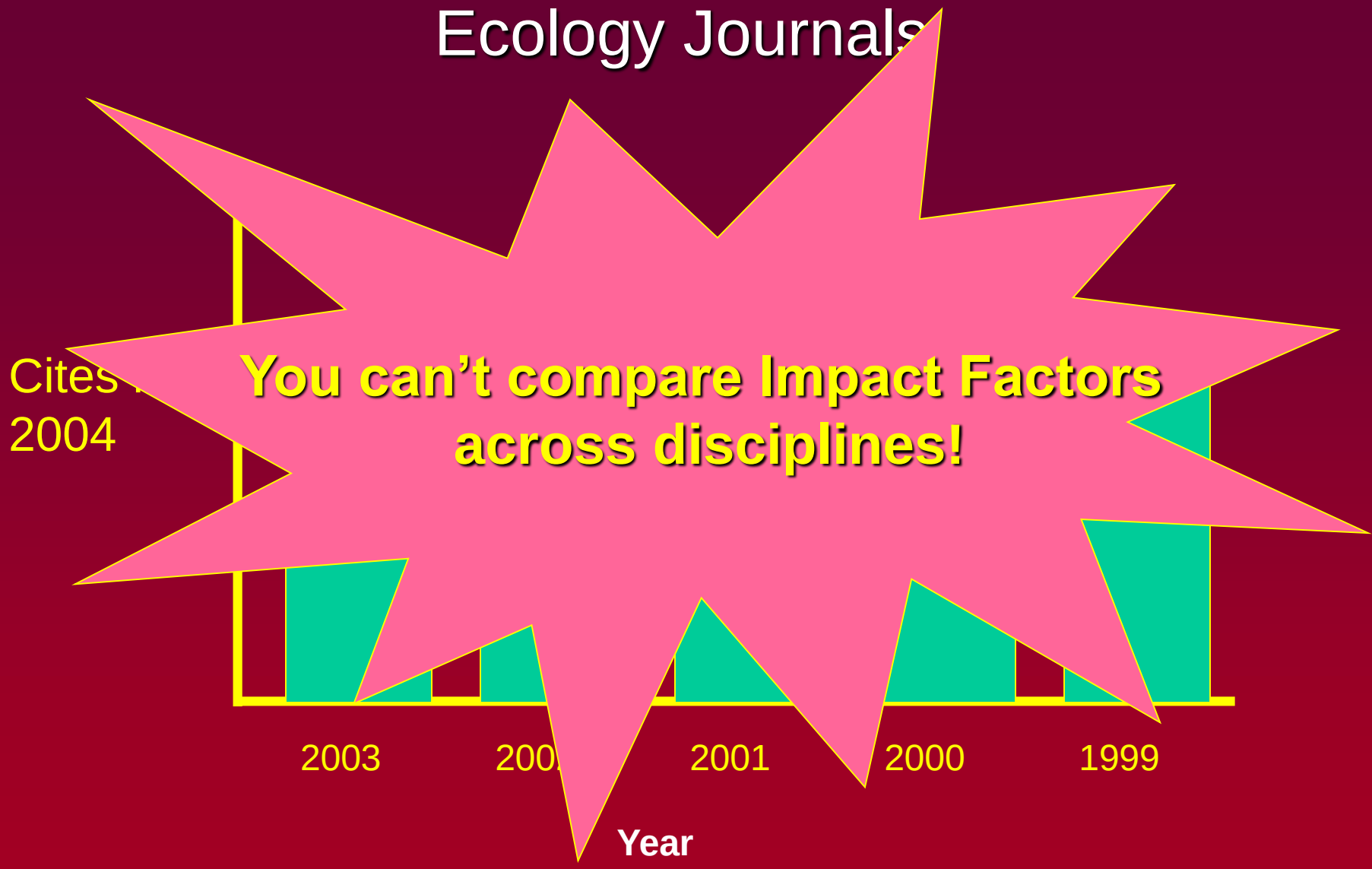
http://isi10.isiknowledge.com/portal.cgi?DestApp=JCR&Func=Frame

Medical Journals

Molecular Biology Journals

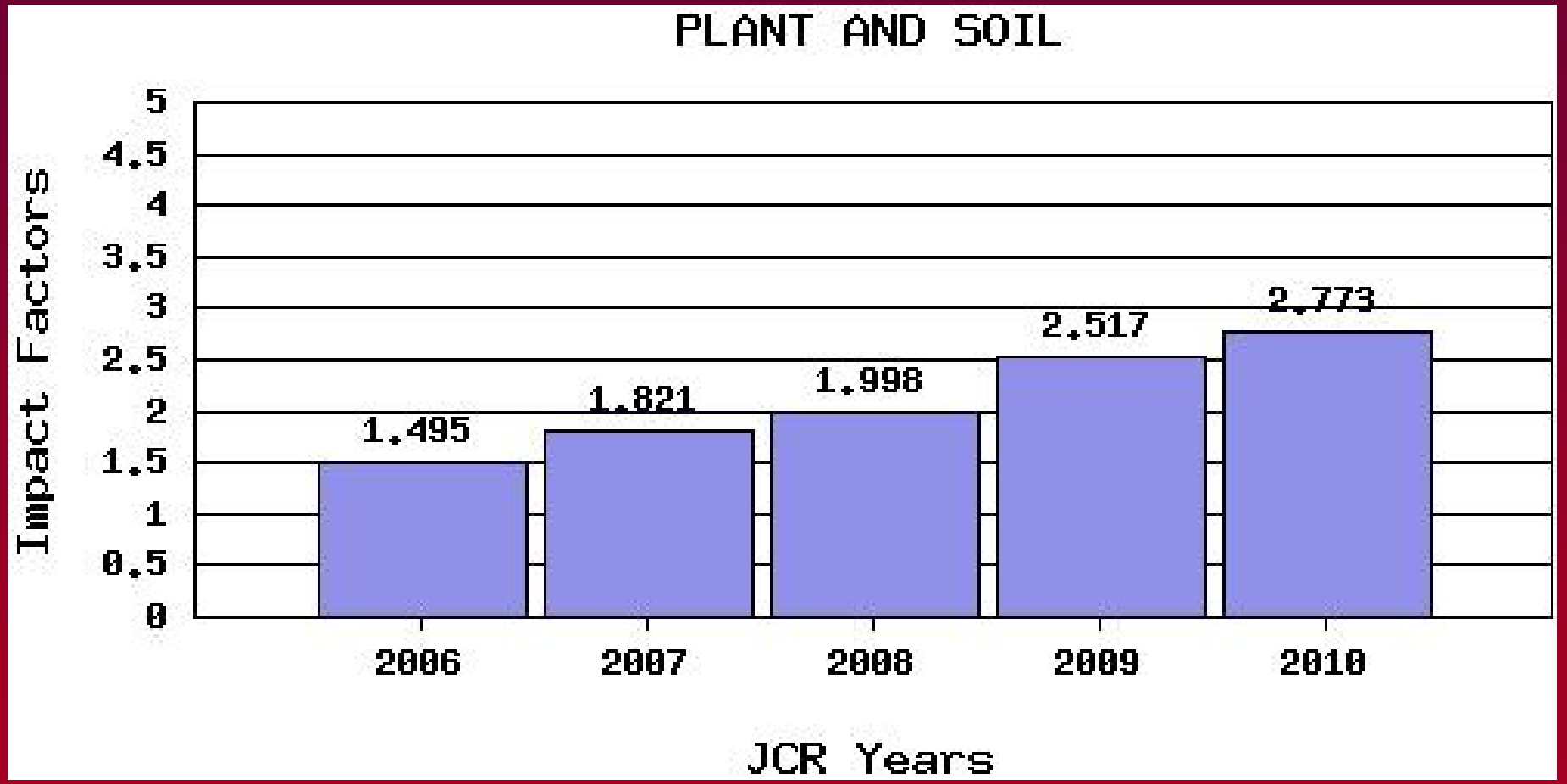


Ecology Journals



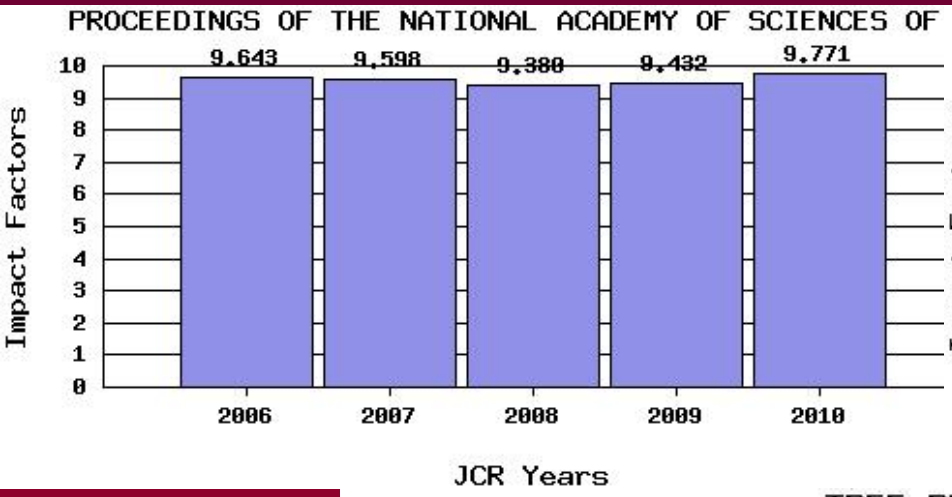
You can't compare Impact Factors across disciplines!

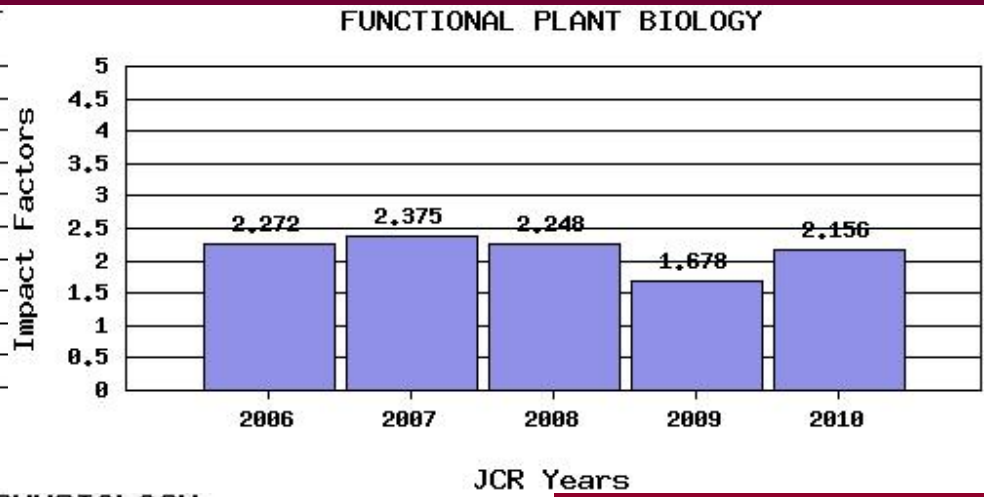
Impact factors may change over the years, as published on the ISI website

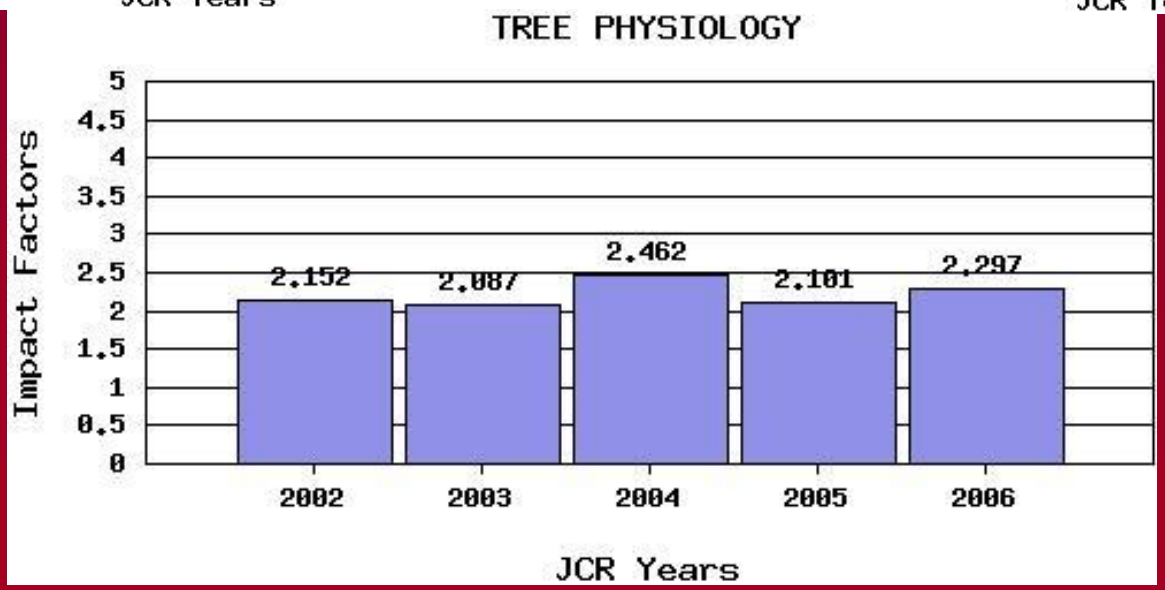


http://isi10.newisiknowledge.com/portal.cgi/jcr

For some journals we see little change (or a downward trend)







Where should you never publish?

- So-called ‘open access journals’ run by individuals who do so for financial gain only
- These ‘journals’ do not care about science and academic integrity
- Jeffrey Beal refers to them as ‘predatory journals’
- He maintains a list of these journals online, at: http://www.academia.edu/1151857/Bealls_List_of_Predatory_Open-Access_Publishers

Plan your experiments in such a way that the data can be published

- Make sure you have a sound question (hypothesis) before you begin your research
- That hypothesis may not be the same you wish to use when publishing the data
- Research without a sound hypothesis is hard to write up, but …
- sometimes there are good reasons to make an 'inventory' (no sound hypothesis required)
- Think twice (three times in China) before you start your experiments

Data that have not been published do not exist!

If you do not publish your data, you might as well not do the experiments

Published data can make a lasting impression, like the Great Wall in China

Photo Dr Jianbo Shen, CAU, Beijing, PR China

“*There are three necessary steps in useful research; the first to begin it, the second to end it and the third to publish it.*”

Michael Faraday

The structure of a scientific paper

- Authors + addresses
- Title, running title
- Abstract
- Keywords, abbreviations
- Introduction
- Materials and methods
- Results
- Discussion
- Acknowledgments
- References
- Tables and Figures

Lindsay, D. (1984) A guide to scientific writing. Longman, Cheshire.

Begin with the Results section

- Arrange your data in figures and tables
  - Are the data best presented as figures or as tables?
- Decide which figure/table comes first
- Decide the order of all other figures/tables
- Make a structure for your Results
  - Decide what you wish to describe
  - Design the sections in the Results ('dot points')
- Then make a structure for each section (dot point)
  - Decide what you wish to describe in each section
- Then start writing

An example of a structure of your Results section in ‘dot points'

- Root morphology
  - Specific root length
  - Root thickness
- Root exudates
  - Carboxylates
  - Phenolics
- Effect of root exudates on mobilisation of phosphate
  - Effect of carboxylates
  - Effect of phenolics

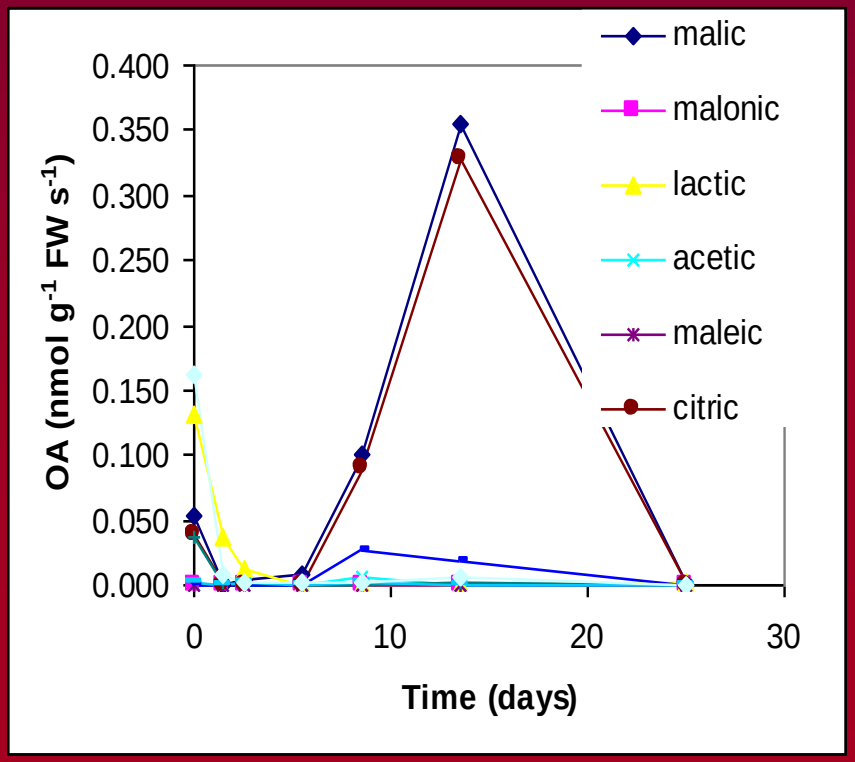
The style in the Results section

- Write your results in the past tense
- Avoid 'contractions', *e.g.*, it's and they're
- Avoid complex constructions
  - *The rate of photosynthesis was not very fast.*
  - *The rate of photosynthesis was slow.*
- Use the active voice
  - *I remember my first visit to China.* (active voice)
  - *My first visit to China is remembered by me.* (passive voice)
  - This rule does not mean that you should entirely discard the passive voice

http://www.bartleby.com/141/strunk5.html

The choice between a Figure or a Table

Age		malic	malonic	lactic	acetic	maleic	citric	cis-aco	succinic	fumaric	trans-ac	Total
0		161	0	371	0	0	119	109	0	7	484	1252
1.5		0	0	66	0	0	0	4	0	2	14	86
2.5		17	0	41	0	0	0	1	0	4	5	68
5.5		21	0	0	0	0	0	0	0	0	6	27
8.5		929	0	0	57	0	824	6	209	22	19	2066
13.5		3217	0	0	0	0	3020	14	160	7	54	6471
25		0	0	11	0	0	0	0	0	0	0	11



The choice between a few lines in the text or a Table

The yield of rice was 1.232, 2.798, 3.193, 1.009 and 4.272 ton ha^{-1} for the farms of Dong, Zheng, Cheng, Wong and Shen, respectively

Dong	Zheng	Cheng	Wong	Shen
1.232	2.798	3.193	1.009	4.272

These results are easier to take in when presented in a Table

Can we make the table clearer by altering the columns and rows?

Dong	Zheng	Cheng	Wong	Shen
1.232	2.798	3.193	1.009	4.272

Dong	1.232
Zheng	2.798
Cheng	3.193
Wong	1.009
Shen	4.272

Should we order the data in a different manner?

Arrange the farmers alphabetically?

Cheng	3.193
Dong	1.232
Shen	4.272
Wong	1.009
Zheng	2.798

No improvement!

Should we order the data in a different manner?

Arrange in order of increasing yield?

Wong	1.009
Dong	1.232
Zheng	2.798
Cheng	3.193
Shen	4.272

Shen did much better than any of the other farmers!

Do we need this level of precision?

Wong	1.009
Dong	1.232
Zheng	2.798
Cheng	3.193
Shen	4.272

Wong	1.0
Dong	1.2
Zheng	2.8
Cheng	3.2
Shen	4.3

Include as many decimal places as justified by the accuracy of your data


TEBG is the lowest elevation
garden in the world
世界海拔最低的植物园
-80.97M
中国科学院
吐鲁番沙漠植物园

The columns of a table must be labelled appropriately, and the units must be included too

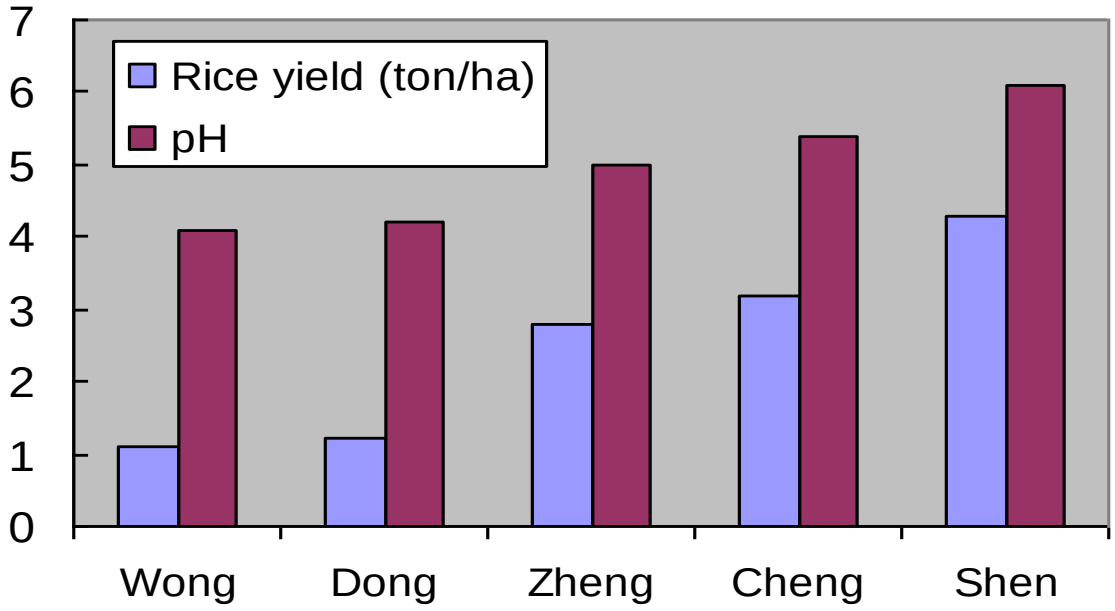
Farmer	Yield (ton ha^{-1})
Wong	1.1
Dong	1.2
Zheng	2.8
Cheng	3.2
Shen	4.3

We can quickly see why the yield on Shen's farm was so high: optimum pH!

Farmer	Yield (ton ha^{-1})	Average soil pH
Wong	1.1	4.1
Dong	1.2	4.2
Zheng	2.8	5.0
Cheng	3.2	5.4
Shen	4.3	6.1

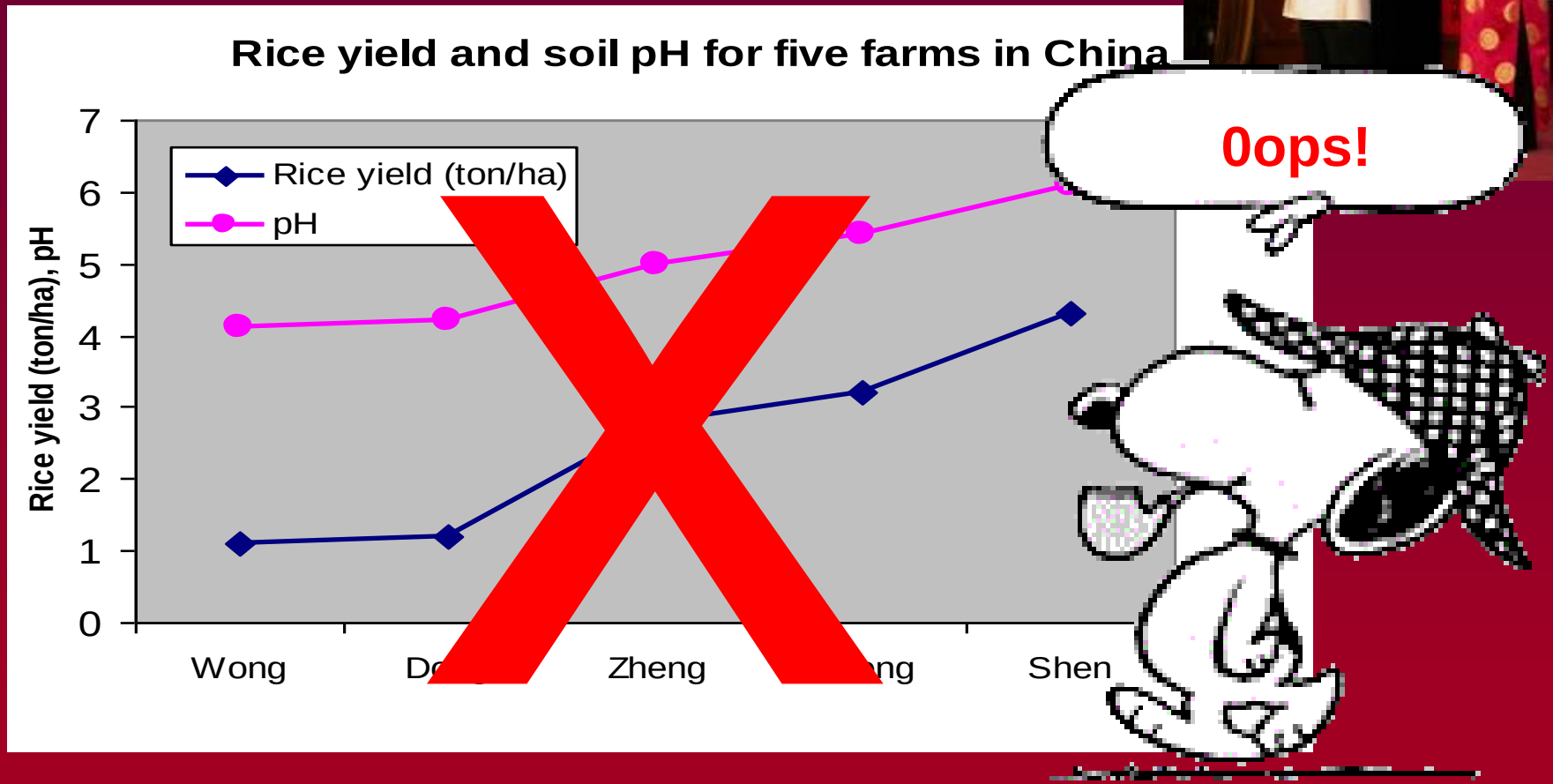
Would a Figure have been better in this example?

Rice yield and soil pH for five farms in China.



I don’t really think so, but it is a matter of opinion

Would lines, connecting the data points have been a good idea? Or perhaps regression lines?



Never connect data points, if the data on the x-axis are not 'scaled' – regression lines would have been a mistake!

All figures and tables require appropriate legends

- Describe what is shown
- Do *not* discuss what is shown
- Explain abbreviations, if you use any in figures or table
  - Even when you use the same abbreviations throughout text
  - WUE = water-use efficiency
- Explain errors bars: SE or SD; add *n* (number of observations)
- Explain meaning of statistical information
  - *, **, ***

Make sure you use acceptable units, not ones that are 'out-of-date'

- Recommended/preferred SI units
- In addition, double prefixes are best avoided
  - For example, use $\mu g\ g^{-1}$, rather than $mg\ kg^{-1}$
- For information on SI conventions, the following Web site may be helpful: http://physics.nist.gov/cuu/index.html

	SI or recommended/preferred units	Non-SI or discouraged / unacceptable units
Length	nm, μm, mm, m, km (*i.e.* m, and up and down by factors of thousand)	cm, dm, dam, hm; inch, foot, yard, mile
Area	nm^2, μm^2, mm^2, m^2, km^2 (*i.e.* m, and up and down like for length)	cm^2, ha / acre
Volume	m^3 (and up and down like for length); also acceptable L (and up and down by factors of thousand)	cm^3, gallon, cubic feet
Mass	g (and up and down by factors of thousand)	bushel, tonne
Time	s; also acceptable: h, day, year	min
Concentrations	mol m^{-3} (and up and down by factors of thousand); also acceptable: M (and up and down by factors of thousand); mol_c kg^{-1}	cmol kg^{-1}
	g kg^{-1}	%
	μg g^{-1}, μmol mol^{-1}	ppm, ppb
Temperature	Kelvin, K; Celsius, °C	Fahrenheit
Transpiration, photosynthesis, respiration	mol m^{-2} s^{-1}, nmol g^{-1} s^{-1} (and up and down by factors of thousand)	mol cm^{-2} h^{-1}, mol dm^{-2} min^{-1}
Electrical conductivity, electricity and magnetism	Siemens per meter, S m^{-1} (and up and down by factors of thousand)	millimho per centimeter, mmho cm^{-1}
Irradiance	μmol m^{-2} s^{-1}; W m^{-2}, MJ m^{-2} day^{-1}	lux
Pressure, water potential	Pa, kPa, MPa	hPa, atmosphere

The Results

- Figure 1
  - Describe what it shows
  - Number figures in order of appearance in the text
- Table 1
  - Describe what it shows
- Lead the reader through your data
  - From one Figure (Table) to the next
- Arrange a logical flow from section to section

Then continue with writing the Discussion

- Make a structure for your Discussion
  - Decide what you wish to discuss
  - Design the sections in the Discussion (dot points)
- Then make a structure for each section (dot points)
  - Decide what you wish to describe in each section
- Place your results in a wider context
- Compare your results with those in the literature
- Then start writing
- Finish with a paragraph in which you tell the reader what are the main points ('take-home-message')

The Discussion

- The order in the Discussion may differ from that in Results
- Figure 1, Table 1 etc.
  - Explain what they show
- Place your results in a wider context
- How do your data compare with those in the literature?
- Finish with the 'take-home-message'

A bit more about the Discussion

- A good researcher is excited about the results
- Make sure the reader also gets excited
- Explain why your work is important and exciting

The style in the Discussion section

- Write about your own results in the past tense
- Describe published data in the present tense
- Avoid complicated constructions
  - *The rates of phosphorus uptake were not significantly different….*
  - *The rates of phosphorus uptake were the same….*

http://www.bartleby.com/141/strunk5.html

Now the Materials and Methods

- Once you know which data you will include, write up all the Materials and Methods used to acquire the data
- Use the passive voice
  - "Plants were harvested" (instead of "We harvested plants")
- Methods
  - Check if your methods work (recoveries, standards)
  - Reference, details of all modifications
- Equipment, chemicals
  - Manufacturer, city, country
- Growing conditions, treatments
- Species
  - Latin name
  - Authority, *e.g.*, Linnaeus (L.)
  - Cultivar

Materials and Methods

- Include all relevant details
- Check your chosen journal for 'how it is done'
- Do not use 'modified after', but describe the modifications
- Describe so that someone else can repeat your experiments
- Be precise
  - 'Room temperature' is not an accurate description

The Introduction is next

- Briefly review the literature that is relevant for your manuscript (use your Discussion as a guideline)
- Do not just write this Introduction for half a dozen colleagues working in exactly the same field, but…
- Write for a range of interested scientists
- Finish with the aims of your work and present a clear hypothesis

The Introduction

- Briefly review the literature
- Address a wider audience than those working in exactly the same field
- Give the aims of your research and a good hypothesis
- A good hypothesis is one that can be tested, but it does not need to be 'correct'

A bit more about the Introduction

- Explain *why* you did your research
- The fact that nobody has done it before is *not* a good reason
- Your study may follow logically from previous work
- Your project may have been inspired by a practical problem

References

- Cite in a 'balanced' manner and do not ignore specific groups
- Avoid too many references of the work of yourself or your group
- Cite the primary literature, if referring to a key finding
- Cite a review, if you wish to refer to a fact that has been found by numerous authors
- Cite textbooks only when referring to generally accepted knowledge

References

- Check the required format for the chosen journal
  - Order (in text and list)
  - Correct abbreviations of journals:
    http://isiknowledge.com
  - For books: add name of publisher and city
- Are all cited references in the list?
- Have all references in the list been cited?

Acknowledgments

- Acknowledge the input of people and agencies who allowed you to write this manuscript
- Your supervisor (if not a co-author)
- Your technician (if not a co-author)
- Your colleague, who gave you some bright ideas or critically read your manuscript
- Someone who helped you with the language
- Granting agencies
- Others

The title

- It should cover the main aims and/or message
- It should appeal to your audience
- It should not be too long
- Avoid titles with a numbered subtitle
  - Subtitles may get lost, and hence your paper may not be found in searches

The running title

- Some journal also require a subtitle
- It cannot exceed a certain number of characters
  - check instructions for authors of the journal
- Should cover the main aims and/or message
- It is an abbreviated version of your title
- It is only printed above some pages of your paper
- It is *not* used for literature searches
- It is therefore less important than a good title
- Use your actual title as a guideline

The Abstract

- It should contain the aim of your research
- Do not use references in this part
- If you *must* use them, then all details must be there (as in the references list, but without the title) because an abstract must stand on its own
- Make sure the main results and take-home-message are there

The new style of the Abstract for *Plant and Soil*

- The Abstract should not exceed 150 words and should be divided into the following sections:
- Background and Aims (stating the main purposes and research question)
- Methods
- Results (stating the main findings)
- Conclusions

http://www.springer.com/life+sci/plant+sciences/journal/11104?detailsPage=contentItemPage&CIPageCounter=614010

Keywords

- Choose a limited number of keywords that adequately cover your research
- Do *not* use words that already appear in the title
- Think of words that *you* would look for when doing a literature search
- Arrange alphabetically

Abbreviations

- All abbreviations must be explained
- This is commonly done in a section with a separate heading: Abbreviations
- Sometimes it is better to (also) have a separate Table with all the abbreviations
- Avoid using abbreviations in the Abstract
- If you must, these abbreviations must be explained when used the first time

Who are the authors and their addresses?

- Make sure that all authors have a chance to read your manuscript before you submit it
- Never add an author, if this person has not had a chance to read the manuscript
- Include the name of the institute/laboratory where the work was done as the first address
- If you have moved, also add 'present address'

How do you present the names of Chinese authors in international journals?

- Give family name last (unless the journal specifies otherwise)
- This is different from the way you would do it in China
- For example, write Fusuo Zhang and Tuanyao Chai (and not Zhang Fusuo and Chai Tuanyao)
- To avoid confusion, you may write Fusuo ZHANG and Tuanyao CHAI

What is the order of the authors of your paper?

- The person who did the work and wrote the manuscript should be first (=senior) author
- Corresponding author is the one that will be the contact for the journal and correspondence that may follow after publication
- That may be the group leader
- Senior author and corresponding author can be the same
- The research-team leader appears as the last author

Frequently made mistakes

- Invalid statistics
  - For example, presenting linear regressions when one axis is not scaled (for example, sites, species, farmers)
- Units lacking in tables or figures
- Incorrect units:
  - Use s (= seconds), not S (= Siemens)
  - Use kg, not Kg
  - Units of time must appear at the end
    - mmol m^{-2} s^{-1}, not mmol s^{-1} m^{-2}
  - μg, μmol and μM, not ug, umol and uM
  - mmol L^{-1}, not mM L^{-1}
    - mM is short for mmol L^{-1}
- No numbers or legends for tables or figures

Frequently made mistakes (cont'd)

- Low (very negative), not high, water potential
- Cited references not given in reference list
- Incorrect/sloppy style of referencing
- The data shows … (instead of the data show ….)
- Anthropomorphic reasoning
  - "plants attempt…" or "plants struggled…."
- Too many decimal places
  - 0.239876 (SE = 0.052501) should be 0.23 (SE = 0.05)
- No space between values and units, or between different units
  - 20m should be 20 m (but 20% should be 20%)
  - 10mmolm^{-2}s^{-1} should be10 mmol m^{-2} s^{-1}

Just an example

- $L_{pr} = J_{vr} \times (\alpha \times (P_x - P_a))-1$ [mLMPa^{-1}h^{-1}g^{-1} root fresh weight]
- Is that:
- $L_{pr} = J_{vr} \times (\alpha \times (P_x - P_a))-1$ [mL MPa^{-1} h^{-1} g^{-1} root fresh weight]?
- Or:
- $L_{pr} = J_{vr} \times (\alpha \times (P_x - P_a))-1$ [m L M Pa^{-1} h^{-1} g^{-1} root fresh weight]?

Something you must never do

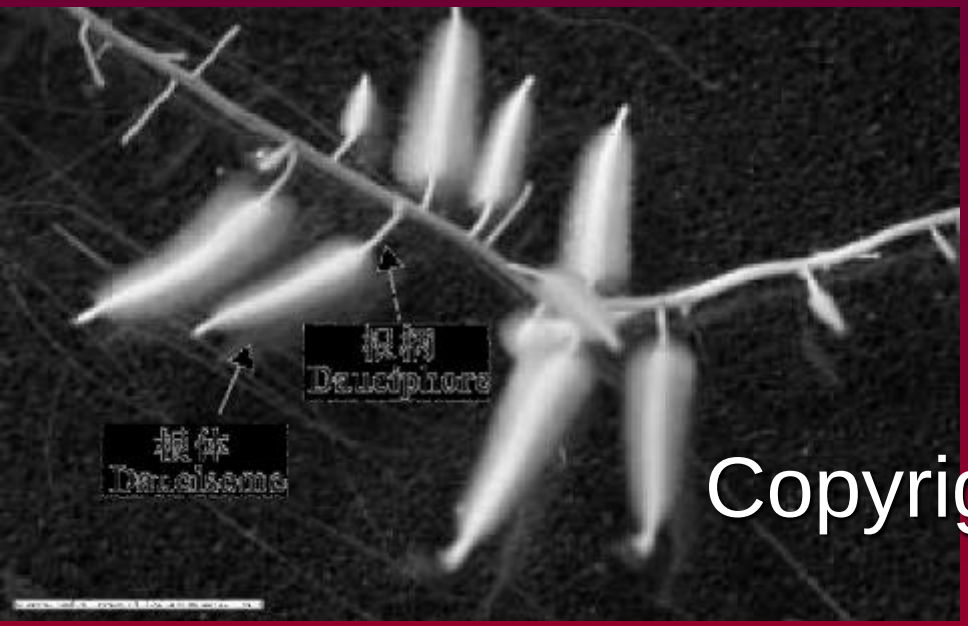
- Never copy whole sentences or paragraphs without referring to the original text
- This is called plagiarism
- It is one of the worst 'crimes' in science
- It will make you look bad, when discovered (which will probably happen)
- It may ruin your scientific career
- Just don’t do it!

A story about plagiarism ….

Fraud in science

- Publication of results that you have not really acquired is considered fraud
- There are examples where 'scientists' have published results that were copied from other journals
- Other 'scientists' have published results that were not really based on actual experiments
- It is probably the worst 'crime' in science
- You are bound to get caught: Just don’t do it!

Another journal (2007)



New Phytologist (2005).

Copyright issues

- The photo on the left was obviously copied from a photo in a paper in the New Phytologist
- The authors acknowledged the source, but did not seek permission from the owner of the copyright
- This is *not* plagiarism, but the authors still made a mistake that must be avoided

Submit your manuscript to only a single journal

- Submitting it to more than one journal at the same time is fraudulent
- Submitting 'almost' the same manuscript to two journals is equally fraudulent
- You will very likely get caught and blacklisted
- Your supervisors and superiors may be informed
- If your manuscript gets rejected, then you can submit it to an alternative journal

Finally, a few comments on language and the structure of sentences and paragraphs

A few hints

- Avoid complicated sentences
- Do not use words that you *think* you understand, but have not really checked carefully
  - Too easy to do when using your computer program, without checking in a dictionary
- Do not make sentences that are too long
- Use a spelling checker, and use either UK English, or US English, but *not a mixture of both*

Spelling checkers pick up some mistakes, but not all

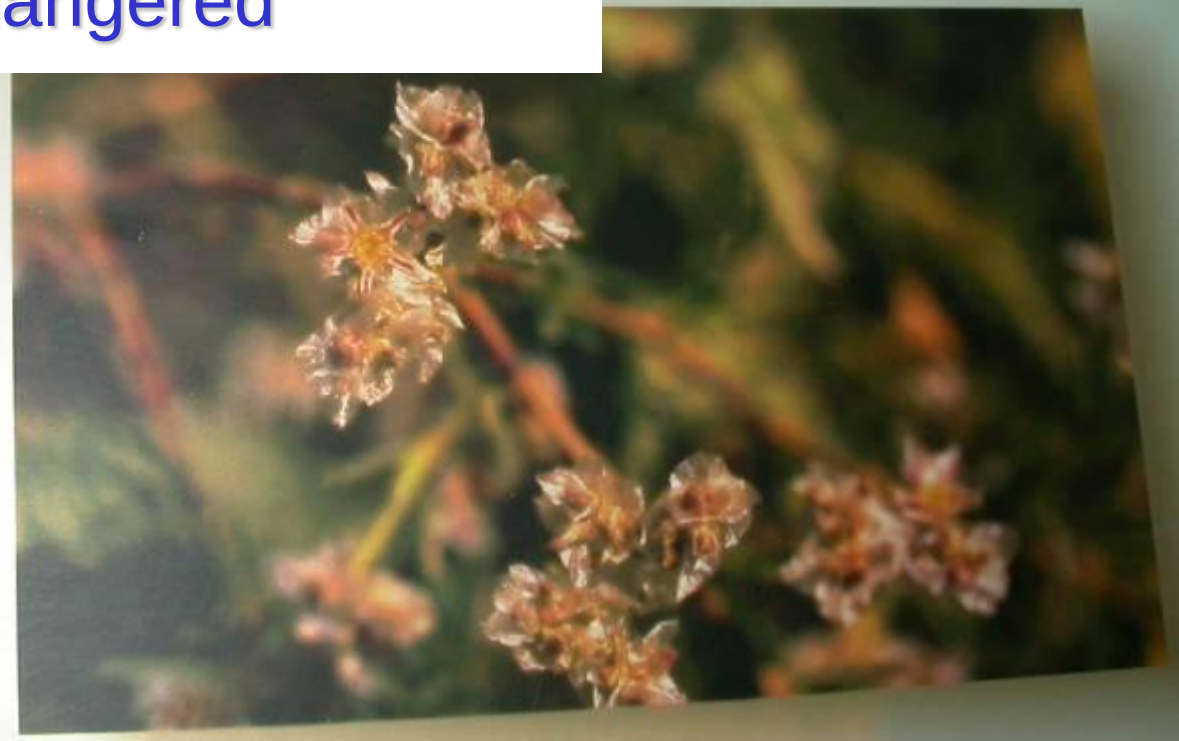
- Sauna
- Barber
- Ball
- Guest

荒漠珍稀濒危植物的
迁地保护

THE *EXSITU* CONVERSATION OF THE VALUABLE
DANGEROUS DESERTS PLANTS

- *Exsitu*: *Ex situ*
- Conversation: Conservation
- Dangerous: Endangered

功43种国
荒漠珍稀
殖方法(包
形态解剖、
学特性、
粉形态及



More about spelling checkers

Eye have a spelling chequer.
It came with my pea sea.
It plainly marques four my revue.
Miss steaks eye kin knot sea.

“The information that begins a sentence establishes for the reader a perspective for viewing the sentence as a unit.”

Gopen, G.D. & Swan, J.A. 1990. American Scientist 78: 550-558.

An example of how (not) to begin a sentence

1. Regardless of the P concentration supplied to the other root half, the P concentrations in root halves supplied with 1 µM P were low.

2. The P concentrations in root halves supplied with 1 µM P were low, regardless of the P concentration supplied to the other root half.

In 2., the important part is placed at the beginning. Therefore, that is the sentence order you should use!

“Do not use the elevator, in case of fire”

That means: “Never ever use the elevator, because, one day, there may be a fire”

“Beginning with the exciting material and ending with a lack of luster often leaves us disappointed and destroys our sense of momentum.”

Gopen, G.D. & Swan, J.A. 1990. American Scientist 78: 550-558.

Therefore, the structure of the Discussion should be both logical and exciting

- Begin with a brief overview of the importance of your findings
- Continue to explain the rest in context of the literature
- Hide what must be included, but is not really exciting
  - This can be done by presenting it in a Table in Results, without further discussing in Discussion
- Finish with the most important and exciting aspects: the 'take-home-message'
- No need to use the same order as in Results

The structure of a paragraph

- Text is organised in paragraphs
- Paragraphs have a distinct structure
- They are *not* arranged so as to have a certain number of sentences or lines
- Paragraphs deal with *one* topic
- Paragraphs begin with a sentence that 'sets the scene'
  - An introduction to what the paragraph is about
- Paragraphs finish with a conclusion
  - A sentence that refers back to the first sentence

http://www.bartleby.com/141/strunk5.html

An example of a 'bad' paragraph

In such a relationship, day respiration is as an additional term that decreases *A*. Such an effect is nevertheless small, as the order of magnitude of *Rd* ordinarily lies below 1 µmol m-2 s-1 (see also below). However, the ratio *Rd/A* becomes much more important under stress conditions (e.g., drought) when photosynthesis can decrease by nearly 90% while respiration might be little affected or even increased. Nevertheless, it should be recognized that photosynthesis under drought may also be accompanied by an increase of refixation of respired CO2 due to stomatal closure (Haupt-Herting *et al.* 2001), and so uncertainty *…….*

Because the first sentence is not an 'introduction', but it continues the preceding paragraph

I found the following websites very useful for rules where (not) to place commas, for synonyms, and for explanations of words

- Website for Strunk & White's "Elements of Style" is: http://www.bartleby.com/141/strunk.html#1
- Website for Roget's "Thesaurus" is: http://www.bartleby.com/62/
- Web Site for Fowler's "Dictionary" is: http://www.bartleby.com/116/ (great to read about mistakes made in the Times, the Daily Telegraph, and Dickens)

A final check

- Check the instructions for authors again
- Did you follow all instructions properly?
- Remember: it is not the task of the reviewers or the editor to take care of details you should have checked yourself
- Your manuscript may be sent back without review, if you have not addressed these items
- ☹

Before you submit your manuscript to a journal

Always ask a colleague, friend or a discussion group to 'review' your manuscript

Their suggestions may lead to elimination of small mistakes and improve the readability of your manuscript

Journals often ask to nominate a Section Editor or Reviewers

- Select a Section Editor who is an authority in your field, preferably from outside your own country
- Suggest Reviewers who are active in your field of research, preferably from outside your own country
- Avoid suggesting close friends or colleagues in the same institution
- Making the right choice shows the Editorial Board you have given this some thought

What should you include in a covering letter?

- A sentence or two about the subject and novelty of your results
- An explanation why you have chosen the journal you submit your manuscript to
- An explanation explaining how your paper fits with the scope of the journal

Send it off, and wait for the editorial decision

Never send the same manuscript to more than one journal

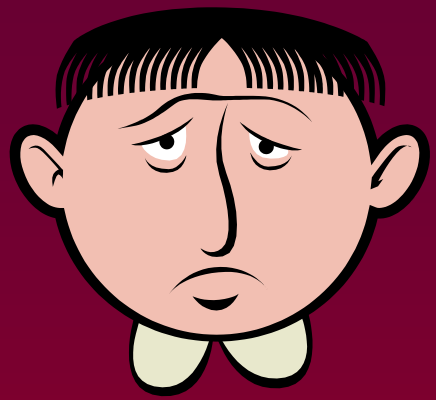
What next?

- You should receive a note from the journal that your manuscript has been received
  - If this does not happen, check with the journal
- After several weeks you will receive the editorial decision
  - If this does not happen in a reasonable time, check with the journal
- This decision can be:
  - Accepted without revision (extremely rare)
  - Accepted with minor/major revision
  - Rejected with(out) an invitation to resubmit your manuscript

How do you respond when minor/major revision is required?

- Carefully consider all the points raised by the reviewers and the editor
  - They have spent time on your manuscript, and you must give all their points careful attention
- Make the requested changes if you consider that these changes are appropriate
- Explain in a letter to the editor why you did *not* make the changes
  - You will need good reasons!
- Return the revised manuscript as soon as possible

If your manuscript is rejected...



Don’t write an angry rebuttal!!

How to write a rebuttal letter

Be polite!

Thank the reviewers and editor for the time they have spent on your manuscript

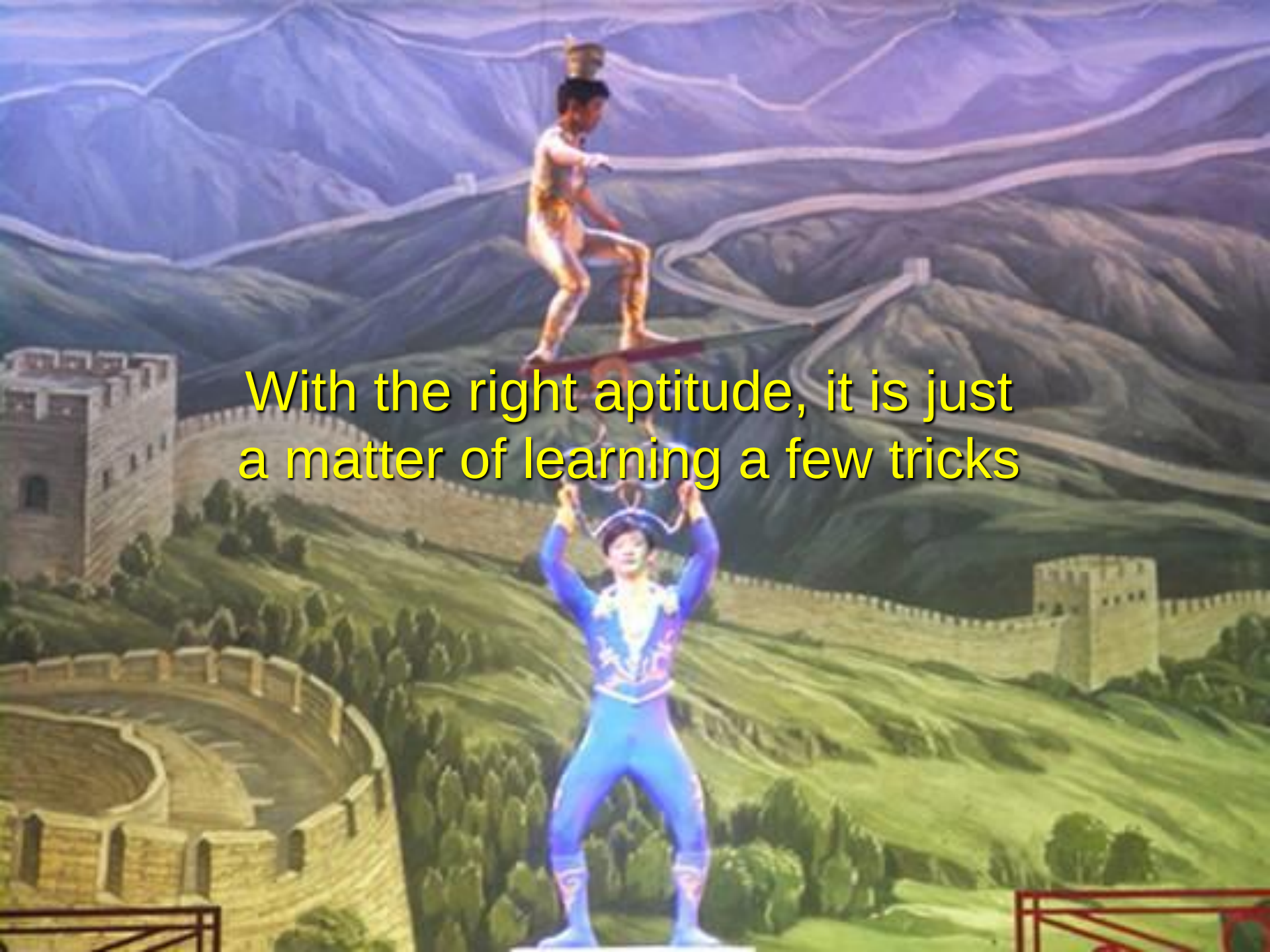
Explain your case clearly

Accept the editor’s response

How to respond when a manuscript has been rejected, with(out) an invitation to resubmit?

- Carefully consider the critical points
  - Use the critical points to improve your manuscript
  - You may need to read more literature
  - More experiments may be required
- Revise your manuscript
  - Resubmit your manuscript to the same journal (if invited to do so)
  - Choose an alternative journal (if not invited to resubmit to the same journal)
- Never submit your manuscript to an alternative journal without appropriate revision
  - Your revised manuscript may end up in the hands of the same reviewer

Send it off again, and wait for the final editorial decision


With the right aptitude, it is just
a matter of learning a few tricks