

# *Dialictus*: Barcoding a Taxonomist's Nightmare



Jason Gibbs, Cory Sheffield and  
Laurence Packer

# Overview



- The Importance of Bees
- The importance of bee taxonomy
- Barcoding a nightmare taxon
- A rant (neither of my coauthors should be held responsible for this!)

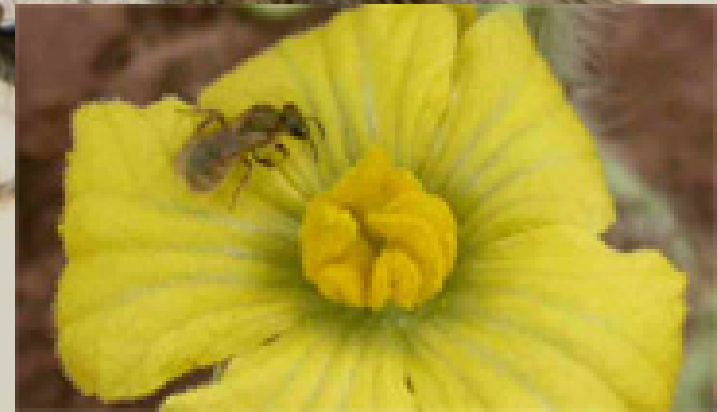
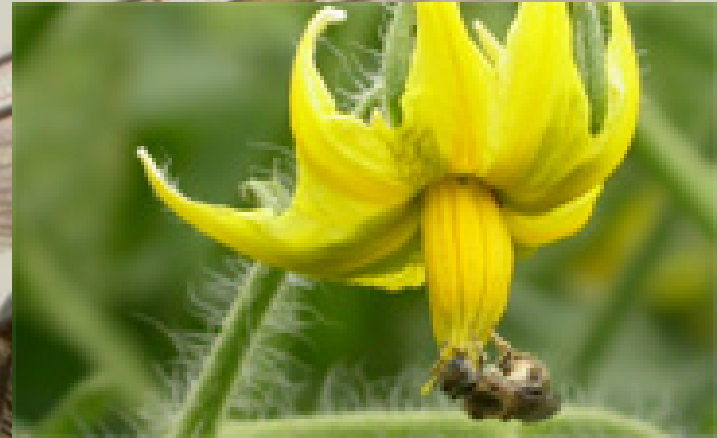


BEES: ~18,000  
species in 9 families  
~800 species in 7  
families in Canada



# Importance of Bees

- 1/3 of our food production is dependent on pollination (primarily by bees)
- Pollination of wildflowers
- Bees as 'miner's canaries' of ecosystem health



# Importance of Bee Taxonomy?



# BEEES

OF THE WORLD



CHRISTOPHER O'TOOLE & ANTHONY RAW

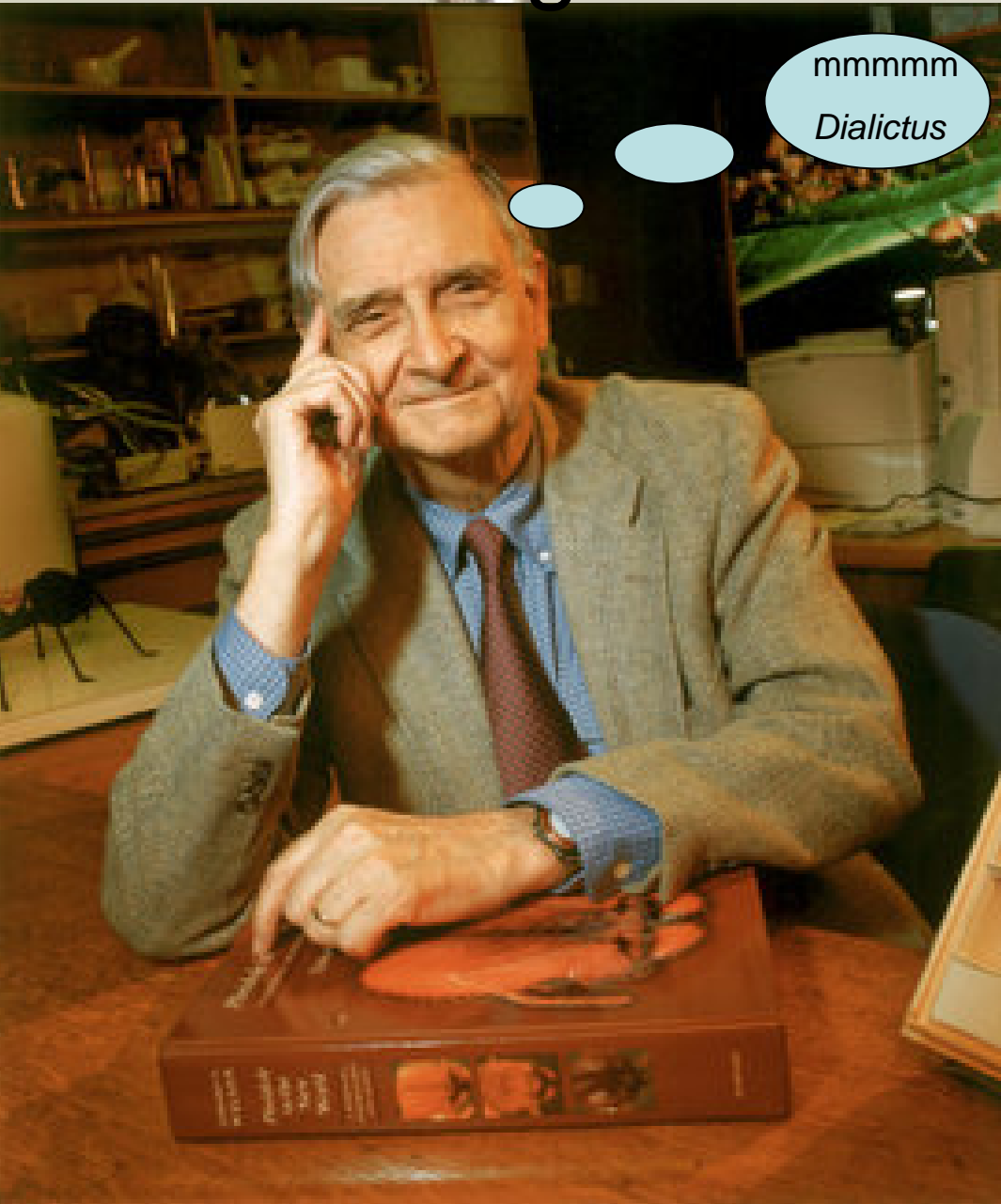


# The importance of *Dialictus* Systematics

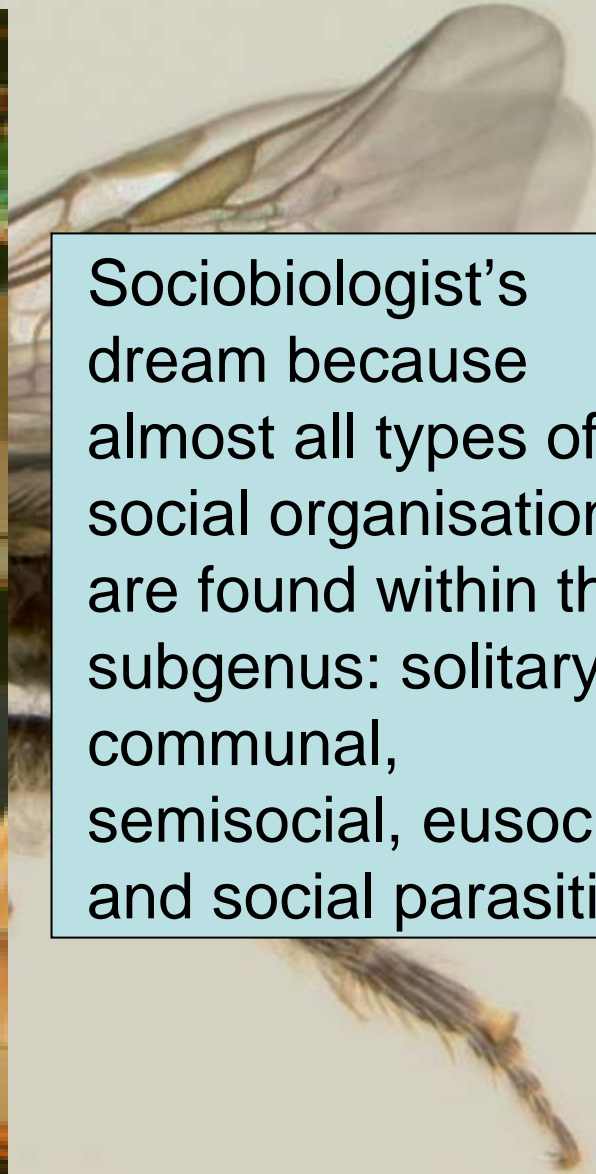


In North American bee biodiversity surveys, members of this one subgenus can represent over 60% of the individuals collected!

# Sociobiologist's dream

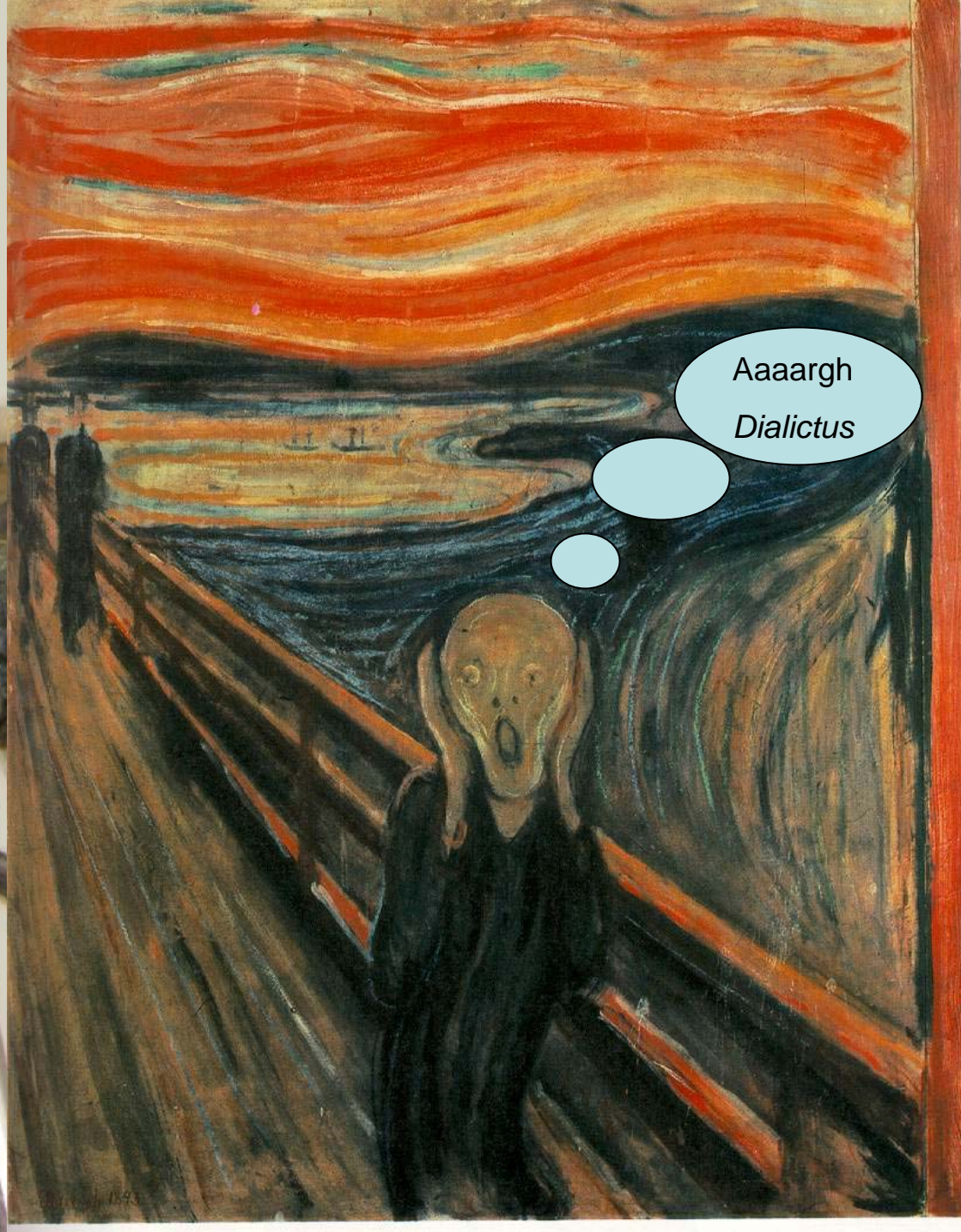


Sociobiologist's dream because almost all types of social organisation are found within the subgenus: solitary, communal, semisocial, eusocial and social parasitism.





# Taxonomist's nightmare



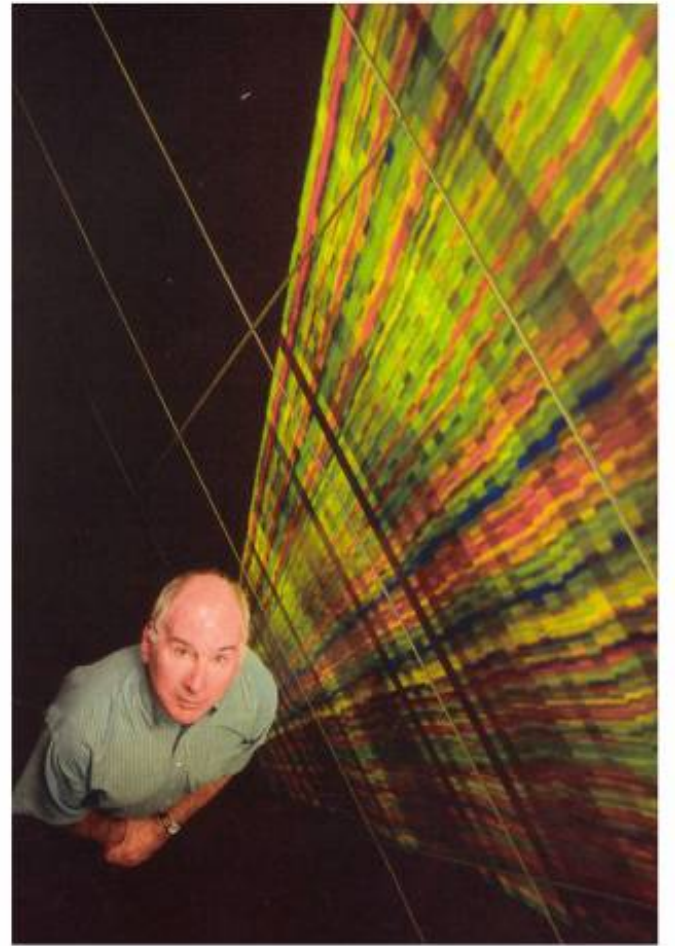
# *Dialictus* – taxonomist's nightmare

- Speciose subgenus of *Lasioglossum*
  - >500 described species worldwide
  - >200 in Canada and the US
- Morphologically monotonous
- Caste differentiation in social species
- Significant sexual dimorphism

*Dialictus rohweri*  
attacking Jason Gibbs

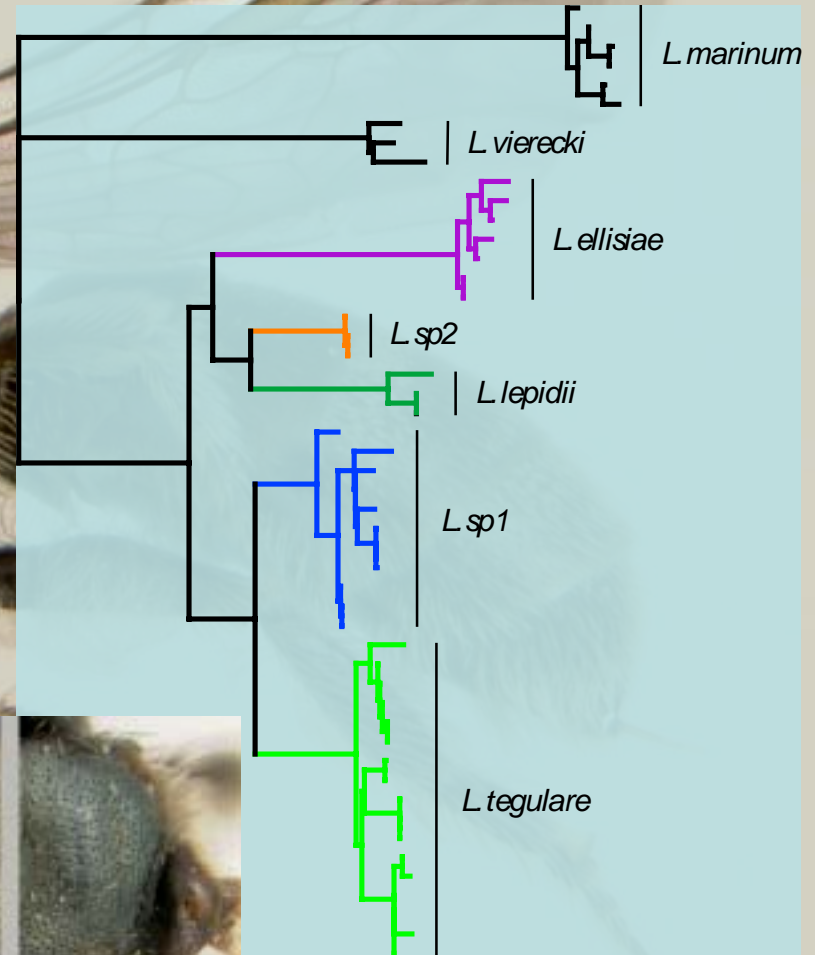


SO?



# Results: Cryptic species

- *Lasioglossum tegulare* is one of the “easy” to identify “species”
- DNA barcodes recognize 5 cryptic species currently grouped under the name *L. tegulare*
- These five species have different geographical ranges and (very) subtle morphological differences



# How Many Species



Based upon 40 species that have been studied in detail:

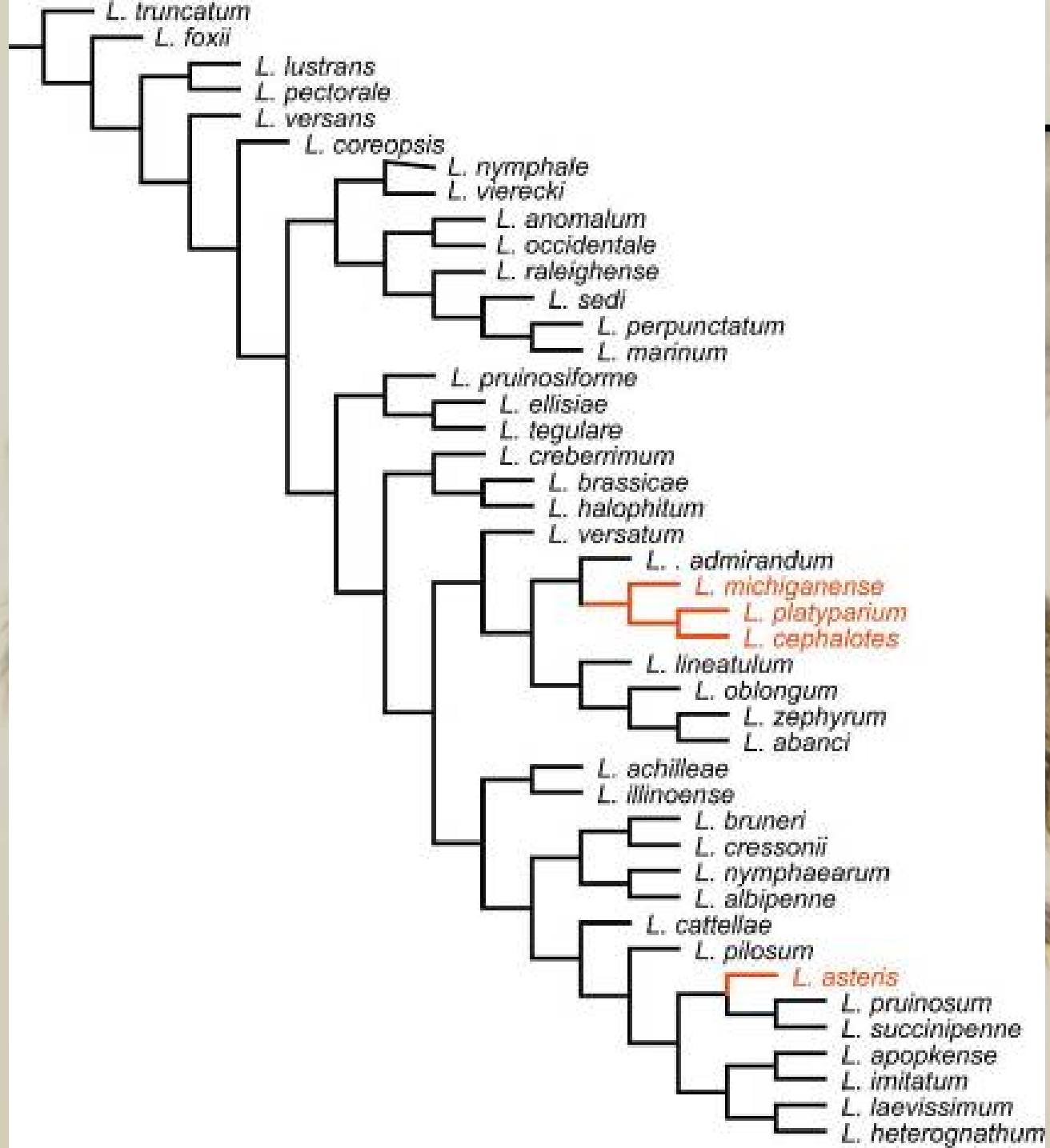
Two names have to be synonymised

An additional 10 species have to be described.

Extrapolated to the entire fauna of ~210

*Dialictus* species currently “known” gives 11 synonyms and >40 additional species.

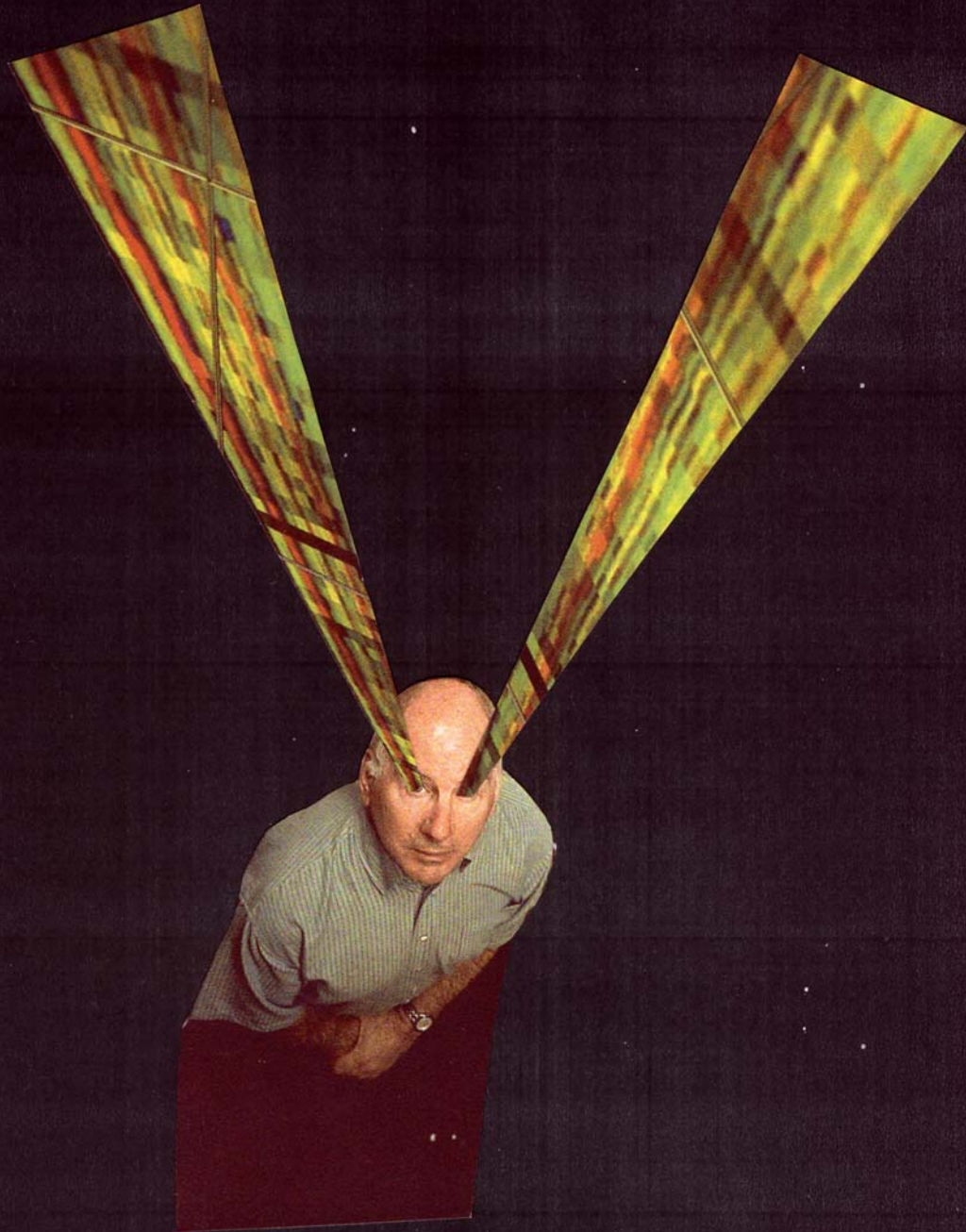




# The Rant



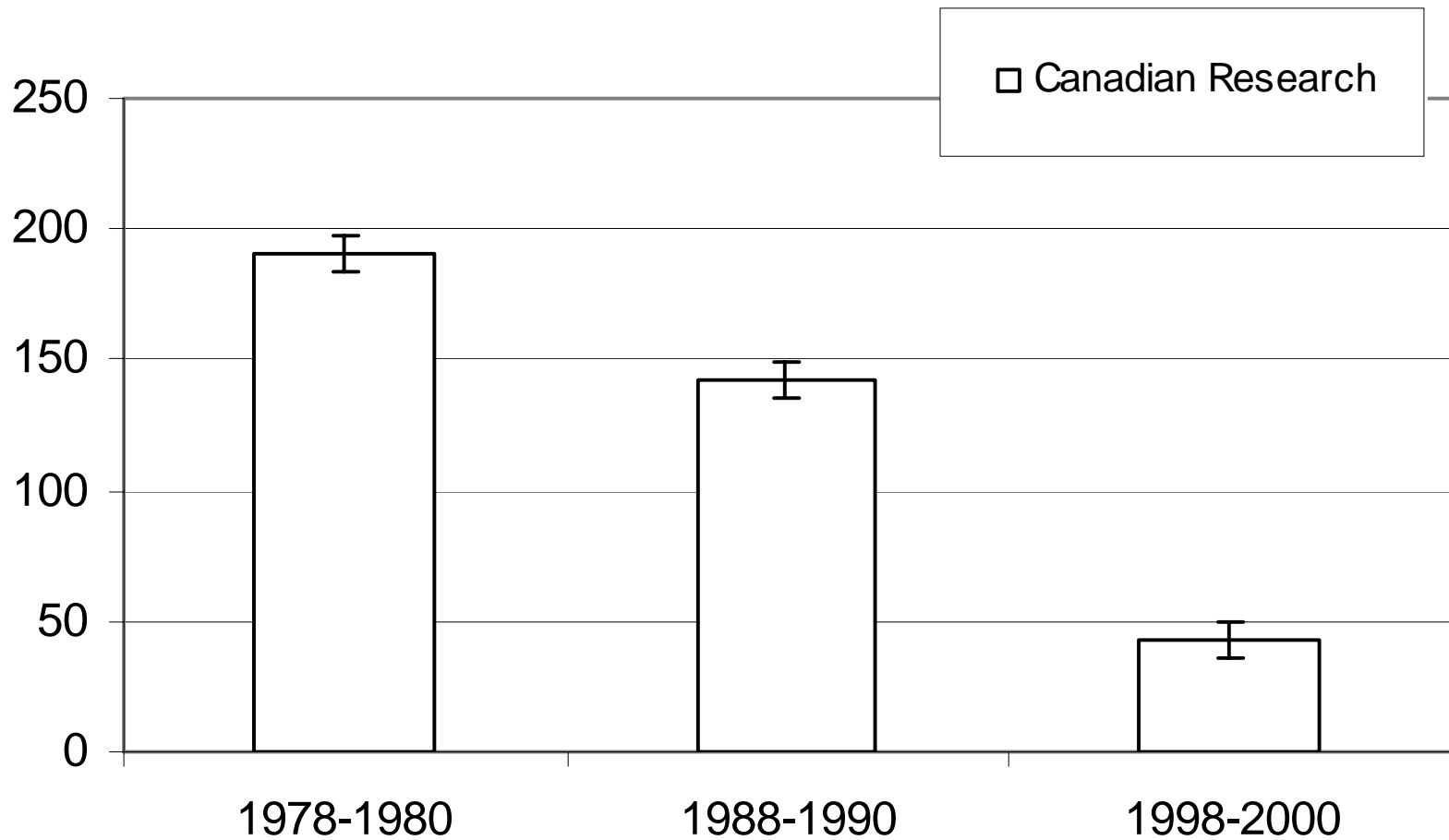
One  
man's  
vision



All the hyperbole touting the promise of DNA barcoding is already siphoning funding from traditional taxonomists.



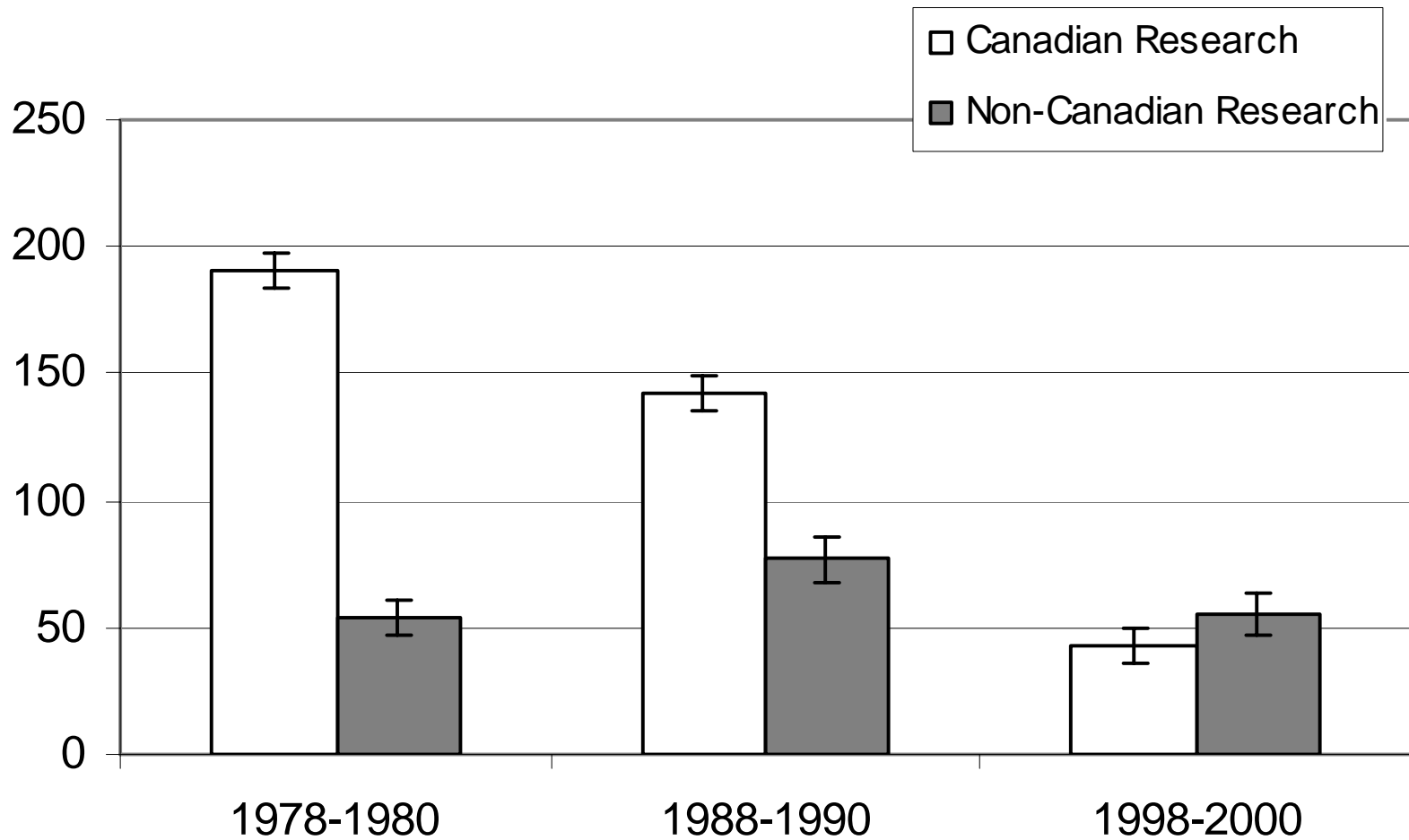
# The Avg. # of Species Described Per Time Period by Canadian Researchers in the Three Major Relevant Canadian Journals



**Time Period**

From Packer, Roughley and Grixti,  
unpublished

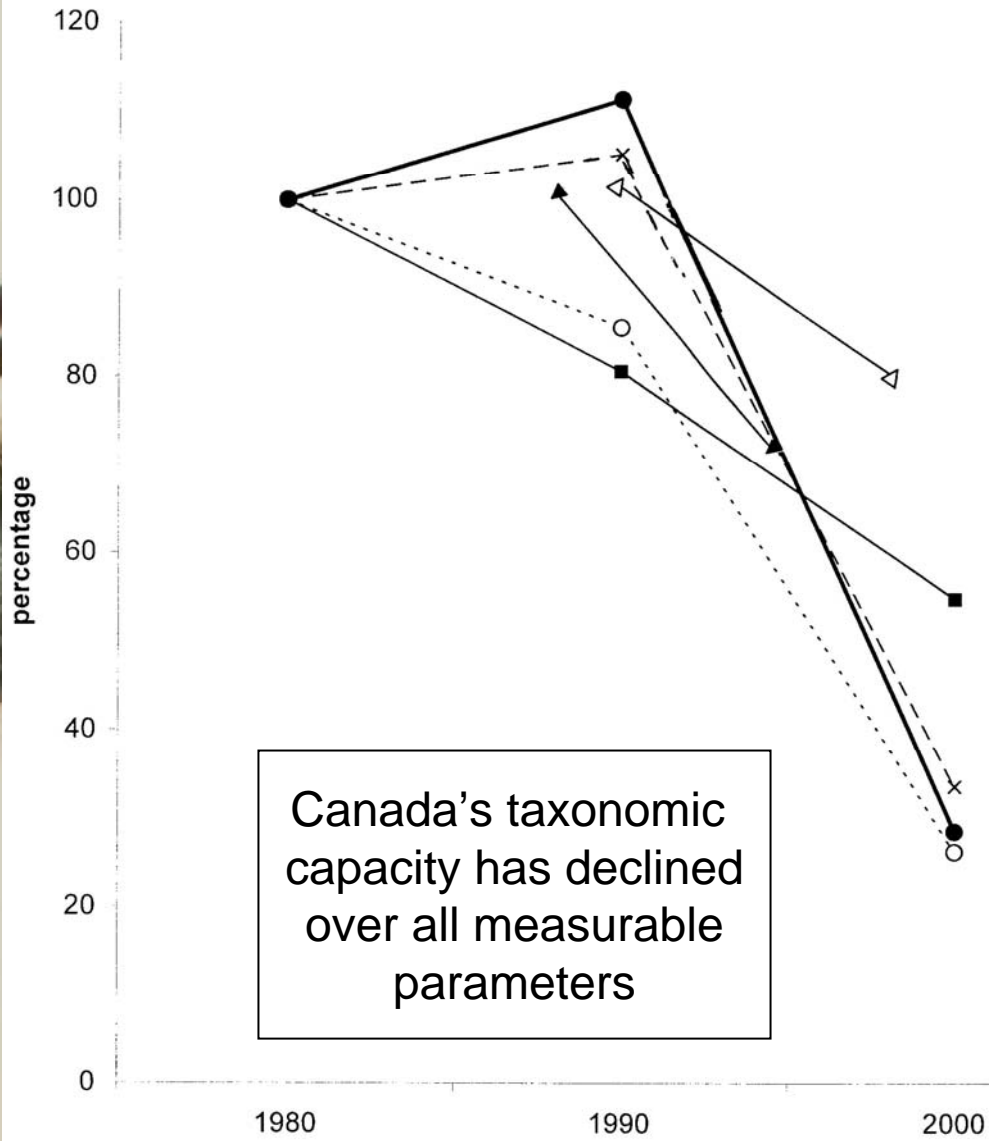
# The Avg. # of Species Described Per Time Period by Canadian versus non-Canadian Researchers in the Three Major Relevant Canadian Journals



**Time Period**

From Packer, Roughley and Grixti, unpublished

percentage change in Canadian taxonomic capacity



- # of new species
- △— NSERC research \$
- ▲— estimated # of taxonomists
- # cnc personnel
- x- # taxonomy papers
- total # revisions



# CONCLUSION



Barcoding isn't siphoning off barely existent research funding for taxonomy in Canada.

It is actually helping save the subject from a slow lingering death.

# Acknowledgements

- Funding through the Canadian Barcode of Life Network



- Barcode central



- Generous donation of specimens from:
  - Sam Droege, Terry Griswold, Bob Minckley, Rob Jean, Andrea Patenaude