Guy Frederick Sutton (PhD)

Research Entomologist

Curriculum Vitae
July 2021

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RESEARCH INTERESTS

I am a Research Entomologist currently based at the Center for Biological Control at Rhodes University in South Africa. My research combines fieldwork, laboratory experiments and statistical models to develop, implement and evaluate practical management options for controlling invasive alien plants, primarily using insects and fungal pathogens as biological control agents.

I have a strong interest in data science/data analysis. I develop and teach a range of statistics courses and workshops, and provide expertise to students and faculty on appropriate and rigorous statistical analyses. Additionally, I develop and maintain two R packages for mapping species distributions and sample size calculations. All my workshops and developmental versions of my R packages are available on my GitHub profile.

PROFESSIONAL APPOINTMENTS

2020 - present **Research Entomologist**
Rhodes University - Uitenhage, South Africa

EDUCATION

2017 - 2021 **Ph.D. (Entomology)**
Rhodes University - Grahamstown, South Africa

2016 **M.Sc. (Entomology)**
Rhodes University - Grahamstown, South Africa

2015 **B.Sc. (Hons) (Entomology)** Awarded with Academic Half Colours
Rhodes University - Grahamstown, South Africa

2012-2014 **B.Sc. (Entomology and Microbiology)** Awarded with Distinction
Rhodes University - Grahamstown, South Africa

PEER-REVIEWED PUBLICATIONS

12. **Sutton, G.F.**, Bownes, A., Visser, V., Mapaura, A., & Canavan, K. (2021). Progress and prospects for the biological control of invasive alien grasses (Poaceae) in South Africa. *African Entomology*. **Accepted**.

11. Olckers, T., Egli, D., Martin, G.D., Paterson, I.D., **Sutton, G.F.**, & Wood, A.R. (2021). Biological control of South African plants that are invasive elsewhere in the world. *African Entomology*. **Accepted**.

10. Canavan, K., Hill, M.P., Ivey, P., **Sutton, G.F.**, Paterson, I.D. (2021). Prioritisation of targets for weed biological control III: A tool to identify the next targets for biological control in South Africa and set priorities for resource allocation. *Biocontrol Science and Technology* 31: 584-601.

9. Chikowore, G., Mutamiswa, R., Martin, G.D., **Sutton, G.F.**, & Chidawanyika, F. (2021). Reduction of grazing index in high elevation grasslands following Black locust invasion in South Africa. *Rangeland Ecology and Management* 76: 109-117.

8. **Sutton, G.F.**, Canavan, K., Day, M.D., & Paterson, I.D. (2021). Field-based ecological studies to assess prospective biological control agents for invasive alien plants: an example from giant rat's tail grass. *Journal of Applied Ecology* 58: 1043-1054. PDF

7. Martin, G.D., Magengelele, N.L., Paterson, I.D., **Sutton, G.F.** (2020). Climate modelling suggests a review of the legal status of Brazilian pepper *Schinus terebinthifolia* in South Africa is required. *South African Journal of Botany* 132: 95-102. PDF

6. **Sutton, G.F.**, Canavan, K., Day, M.D., Den Breeyen, A., Cristofaro, M., McConnachie, A., Goolsby, J.A., & Paterson, I.D. (2019). Grasses as suitable targets for classical weed biological control. *BioControl* 64: 605-622. PDF

5. **Sutton, G.F.** (2019). Searching for a needle in a haystack: where to survey for climatically-matched biological control agents for two grasses (*Sporobolus* spp.) invading Australia. *Biological Control* 129: 37-44. PDF

4. **Sutton, G.F.**, Klein, H., & Paterson, I.D. (2018). Evaluating the efficacy of *Hypogeococcus* sp. as a biological control agent of the cactaceous weed *Cereus jamacaru* in South Africa. *BioControl* 63: 493-503. PDF

3. **Sutton, G.F.**, Paterson, I.D., & Paynter, Q. (2017). Genetic matching of invasive populations of the African tulip tree, *Spathodea campanulata* Beauv. (Bignoniaceae), to their native distribution: maximising the likelihood of selecting host-compatible biological control agents. *Biological Control* 114: 167-175. PDF

2. **Sutton, G.F.**, Paterson, I.D., Compton, S.G., & Paynter, Q. (2017). Predicting the risk of non-target damage to a close relative of a target weed using sequential no- choice tests, paired-choice tests and olfactory discrimination experiments. *Biocontrol Science and Technology* 27: 364-377. PDF

1. **Sutton, G.F.**, Compton, S.G., & Coetzee, J.A. (2016). Naturally occurring phytopathogens enhance biological control of water hyacinth (*Eichhornia crassipes*) by *Megamelus scutellaris* (Hemiptera: Delphacidae), even in eutrophic water. *Biological Control* 103: 261-268. PDF

CONFERENCE PROCEEDINGS

1. Paynter, Q., Poeschko, M., Mitchell, C., Probst, C., Barreto, R.W., Colman, A.A., Macedo, D., Dodd, S., Johnson, T., Mc-Cormack, G., Paterson, I.D., **Sutton, G.F.**, & Winks, C.J. (2018). A weed biocontrol program for the Cook Islands: progress report. In: Hinz, H.L., Bon, M.C., Bourdot, G., Cristofaro, M., Desurmont, G., Kurose, D., Muller-Scharer, H., Rafter, M., Schaffner, U., Seier, M., Sforza, R.F.H., Smith, L., Stutz, S., Thomas, S., Weyl, P., & Winston, R. (Eds.), *Proceedings of the XV International Symposium on the Biological Control of Weeds*, Engelberg, Switzerland, pp. 74-81.

CONFERENCE PRESENTATIONS

10. **Sutton, G.F.**, van Steenderen, C., Canavan, K., Yell, L., & Paterson, I.D. (2017). South Africa is a hotspot for previously unknown stem-boring wasps of grasses (Tetramesa; Eurytomidae). *56th Annual Congress of the Grassland Society of Southern Africa*, 27-29 July 2021, Online Event. (*Presented*).

9. **Sutton, G.F.**, Canavan, K., & Paterson, I.D. (2021). Anthropogenic disturbance reduces the prevalence and abundance of specialist, but not generalist, grass-associated insects across South Africa: implications for biological control. *22nd Congress of the Entomological Society of Southern Africa*, 28th June - 1st July 2021, Online Event. (*Presented*).

8. **Sutton, G.F.**, Canavan, K., Visser, V., & Paterson, I.D. (2020). Invasive grasses as suitable biological control targets: a South African perspective. *46th South African Association of Botanists Annual Conference*, 8-10th Janaury 2020, Qwa-Qwa, South Africa. (*Presented*).

7. **Sutton, G.F.**, Canavan, K., & Paterson, I.D. (2019). Are grasses suitable targets for biological control?: a case-study of two African grasses (*Sporobolus* spp.) invading Australia. *46th National Symposium on Biological Invasions in southern Africa*, 15th to 17th May 2019, Tulbagh, South Africa. (*Presented*).

6. **Sutton, G.F.**, Chari, L., & Canavan, K. (2018). Invasive grasses and classical weed biological control: are we missing a trick? *Invasive Grass Working Group Meeting*, 25th to 27th September 2018, Cape Town, South Africa. (*Presented*).

5. **Sutton, G.F.**, Day, M.D., Canavan, K., & Paterson, I.D. (2018). Prospects for the biological control of invasive rat's tail grasses (*Sporobolus* spp.) in Australia. *XV International Symposium on the Biological Control of Weeds*, 26-31 August 2018, Engelberg, Switzerland. (*Presented*).

4. **Sutton, G.F.**, Canavan, K., & Paterson, I.D. (2017). Are invasive grasses good targets for biological control?: A case study of two African *Sporobolus* spp. invading Australia. *52nd Annual Congress of the Grassland Society of Southern Africa*, 23-28 July 2017, Hoedspruit, South Africa. (*Presented*).

3. **Sutton, G.F.**, Klein, H., & Paterson, I.D. (2017). Does *Hypogeococcus festerianus* (Hemiptera: Pseudococcidae) successfully control the cactaceous weed *Cereus jamacaru* in South Africa? *44th Annual Research Symposium on the Management of Biological Invasions in Southern Africa*, 3-7 July 2017, Pretoria, South Africa. (*Presented*).

2. Paterson, I.D., Paynter, Q., **Sutton, G.F.**, & Mpekula, O. (2015). Potential biological control agents for *Spathodea campanulata* (Bignoniaceae). *XIX Congress of the Entomological Society of Southern Africa*, Rhodes University, Grahamstown, South Africa. (*Contributed data*).

1. **Sutton, G.F.**, Timm, A.E., & Paterson, I.D. (2015). Determination of the origin of two invasive populations of African Tulip Tree using ISSR and AFLP molecular markers. *XIX Congress of the Entomological Society of Southern Africa*, Rhodes University, Grahamstown, South Africa. (*Presented*).

Other Scientific Outputs

(1) Release applications for biological control agents

My research has resulted in the release of biological control agents for the control of invasive alien plants. The releases of biological control agents are my most significant scientific outputs and each released agent is the culmination of many years of work. The applications are reviewed by panels of experts who then advise government as to whether a change to the national invasive species regulations (Conservation of Agricultural Resources Act of 1983) should be made so that a biological control agent can be released. If successful, permission is then granted by the Department of Agriculture, Land Reform and Rural Development (DALRRD) and Department of Environment, Forestry and Fisheries (DEFF).

- Paterson, I.D., **Sutton, G.F.**, Muskett, P.C., Paynter, Q. (2019). Application for the release of *Paradibolia coerulea* (Chrysomelidae) for the control of *Spathodea campanulata* (Bignoniaceae) in the Cook Islands. *Submitted to Cook Islands Ministry of Agriculture March 2019, and the application was accepted August 2019*.

Community Engagement

(1) Public Seminars

1. **Sutton, G.F.** (2021). Invasive alien species in urban gardens - regulations and management. *Port Alfred Gardeners Society*, Port Alfred, South Africa. (*6 April 2021*).

(2) OUTREACH

Mentor, 2015, 2017
Entomological Society of Southern Africa Student Outreach Programme

- Assisted in laboratory set-up, specimen collection and preservation, and practical demonstrations of several aspects of entomology to local Grahamstown school groups

Student Assistant, 2015, 2016
Rhodes University, WILDreach Society

- Aided in specimen collection, curation and preservation techniques, and practical demonstrations and explanations of general aspects of entomology and undergraduate biology to local school groups

TEACHING EXPERIENCE

Introduction to R for biologists 2020-present
6-week post-graduate statistics course

- As co-instructor, I developed a series of lectures for this 6-week honours-level course on linear modeling in R.
- These lectures introduce students to common statistical analyses used in the field of ecology, including: linear regression, ANOVA, ANCOVA and more complex linear models (e.g. binomial GLM, poisson GLM), and demonstrate how to code these analyses in R, including: model diagnostics and evaluation, inference and producing publication-quality written summaries and visualisations.

R Statistics Club 2019-present
Weekly departmental R users group

- I develop and present weekly 1-1.5 hour statistics workshops, primarily using the R statistical software, to graduate students and faculty.
- These workshops are driven by the needs of the attendees, covering topics including: data management/curation, data cleaning, linear modelling, multivariate analyses, data visualisation and spatial analyses (e.g. mapping). All workshops and code are made publicly available, and are available on my GitHub profile.

Practical Demonstrator, Cellular Biology / Molecular Biology / Zoology / Entomology 2015-present
Rhodes University, Department of Zoology and Entomology

- Assisted 1st year undergraduate students with fundamental cellular biology techniques and methods using experimental procedures, including: microscopy, scientific drawing, slide preparation, and scientific writing.
- Demonstrated various aspects of 2nd and 3rd year Zoology and Entomology course practical laboratory classes, including: genetic techniques, forensic entomology, insect specimen curation, and biological control.

AWARDS

Best Student Presentation 2017
Annual Biological Invasions of Southern Africa Symposium
The Ewer Award for Zoology 2016
Rhodes University - Department of Zoology & Entomology
Best Honours Student in Entomology 2016
Entomological Society of Southern Africa
Beth Cummings Award - Best Student Research Project 2014
Rhodes University - Department of Zoology & Entomology
Best Final Year Microbiology Project 2014
Rhodes University - Department of Microbiology & Biochemistry
JC van Hille Award for Academic Excellence 2013
Rhodes University - Department of Zoology & Entomology

SCHOLARSHIPS AND GRANTS

Post-Graduate Scholarship R 30 000 p.a.
2017-present
Queensland Department of Fisheries and Forestry
Henderson Prestigious Post-Graduate Scholarship R 90 000 p.a.
2015, 2017-2018
Rhodes University
Henry Bradlow Scholarship R 90 000
2016
Rhodes University
Department of Environmental Affairs Bursary R 90 000
2016
Department of Environmental Affairs
Honours Degree Scholarship R 45 000
2015
Rhodes University

Total: R 585 000

SOFTWARE DEVELOPMENT

R Package: ThermalSampleR

- ThermalSampleR is an R package I wrote and maintain that performs a range of Monte Carlo simulations and bootstrap resampling procedures to aid sample size planning for determining critical thermal limits (e.g. CTmin/CTmax) of biological organisms.

R Package: sapiaR

- sapiaR is an R package I wrote and maintain that automates the calculation of summary statistics and plotting the characteristic distribution maps derived from the South Africa Plant Invaders Atlas (SAPIA), that are used in numerous publications on invasive plants in South Africa.

PROFESSIONAL SERVICE AND INVOLVEMENT

(9) Review for peer-reviewed journals (n = 9 papers)

- Biological Invasions (2 papers)
- Biological Control (1 paper)
- BioControl (1 paper)
- Biocontrol Science and Technology (1 paper),
- Plant Ecology (1 paper)
- The Rangeland Journal (1 paper)
- South African Journal of Botany (1 paper)
- Environmental Monitoring and Assessment (1 paper)

Workshops attended

ATSC stage-based demographic modelling course January 2019
Oxford University, Oxford, United Kingdom

- Attended a week-long course delivered by Prof. Rob Salguero-Gomez (Oxford University), Prof. Stephen Ellner (Cornell University), Prof. Mark Rees (Sheffield University) and colleagues that taught attendees how to build, analyse and interpret stage-based demographic models, with particular emphasis on integral projection models, using the R statistical platform

Grass identification course September 2018
University of Cape Town, Cape Town, South Africa

- Attended a single-day workshop on the identification of grasses of Southern Africa delivered by Dr. Lyn Fish and Dr. Caroline Mashau (South African National Biodiversity Institute; SANBI)

Professional memberships

Entomological Society of South Africa 2014-present
Alien Grass Working Group of South Africa 2017-present

SKILLS

Computer: R Statistics, markdown, git/GitHub, Julia (beginner)

Language: English (fluent)

LEADERSHIP MANAGEMENT AND ADMINISTRATION

(10) Leadership

3. Invited member of the scientific committee for the 45th National Symposium on Biological Invasions. 12th-17th July, 2015. 2021

2. Member of the Alien Grass Working Group of South Africa. 2017-present

   > This is a professional working group that directly advises government on policies and practices for the management of invasive alien grasses in Southern Africa.

1. Member of the Entomological Society of South Africa. 2014-present

ACADEMIC REFEREES

1. **Dr. Iain Paterson** - *Ph.D. Advisor*
   Center for Biological Control, Rhodes University (Grahamstown, South Africa)
   Email: I.Paterson@ru.ac.za; Tel: (+27)825524643
2. **Prof. Martin Hill** - *Advisor*
   Center for Biological Control, Rhodes University (Grahamstown, South Africa)
   Email: m.p.hill@ru.ac.za; Tel: (+27)825524643
3. **Hildegard Klein** - *M.Sc. Advisor*
   Agricultural Research Council - Plant Protection Research Institute (Pretoria, South Africa)
   Email: KleinH@arc.co.za; Tel: (+27)825524643
4. **Michael Day** - *Project Leader*
   Biosecurity Queensland, Department of Agriculture and Fisheries (Brisbane, Australia)
   Email: Michael.Day@daf.qld.gov.au, Tel: (07) 3708 8553 / 61 7 3708 8553