

***Monitoring and the Public:
A Beautiful Synergy – But
Tread Carefully...”***



Professor Adam Hart



Overview

- Citizen Science – definition and history
- My experiences – ants, spiders, wasps
- Lessons learned
- Future opportunities



“Citizen Science”

Widely said to have been first coined by Rick Bonney (US) and Alan Irwin (UK) in mid 1990s

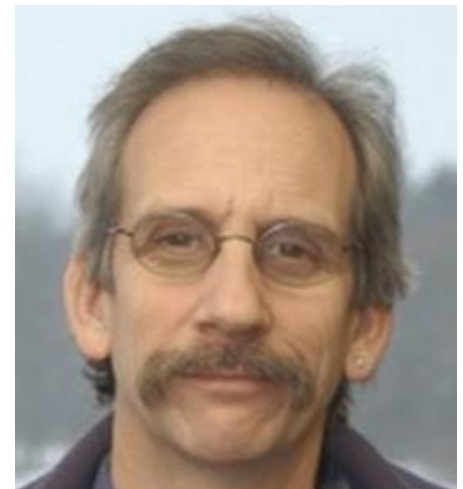
Irwin:

“developing concepts of scientific citizenship which foregrounds the necessity of opening up science and science policy processes to the public”



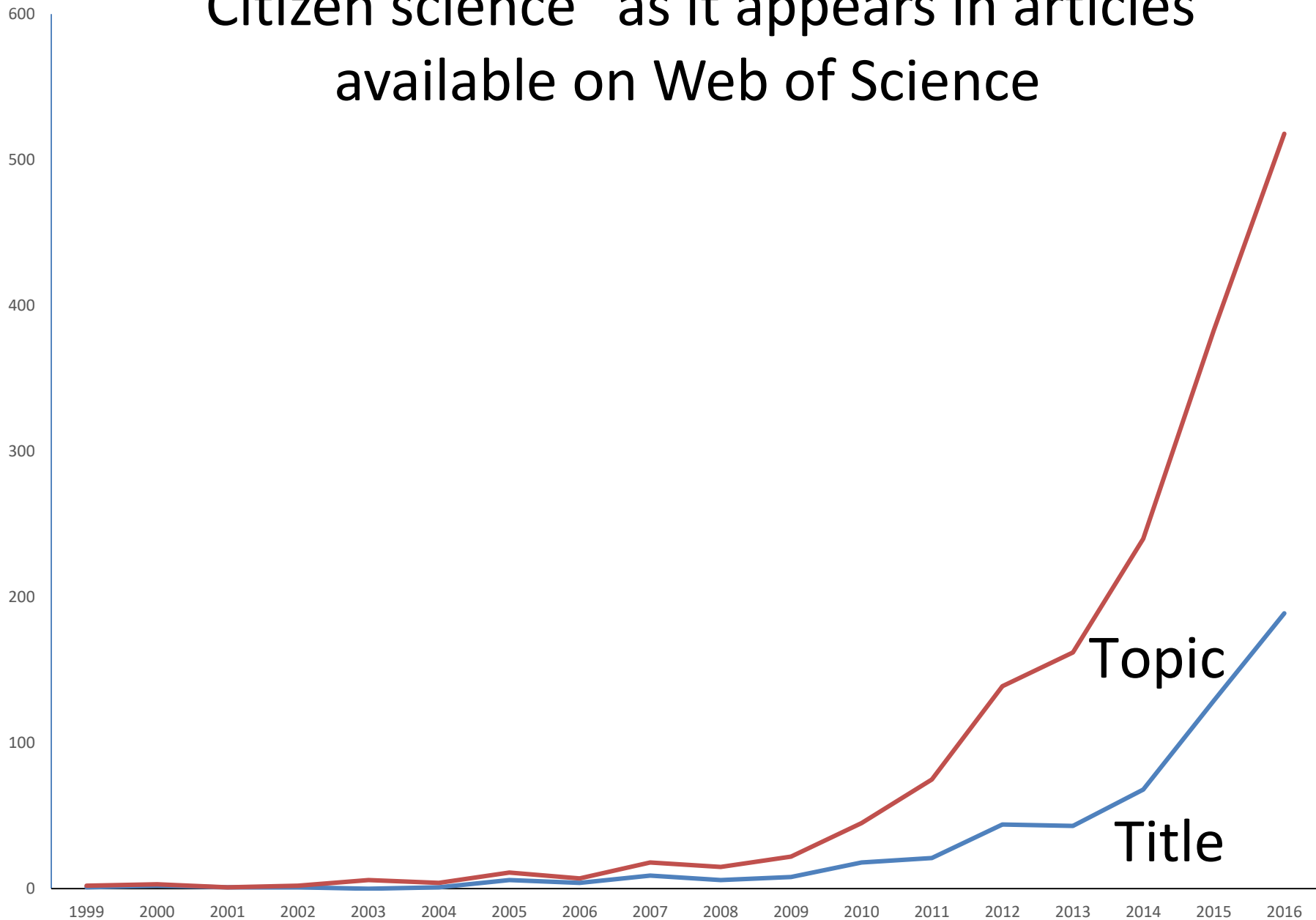
Bonney:

“projects in which non-scientists, such as amateur birdwatchers, voluntarily contributed scientific data”



BUT...

“Citizen science” as it appears in articles available on Web of Science



“Citizen science” as it appears in articles available on Web of Science

2017 – 2820!

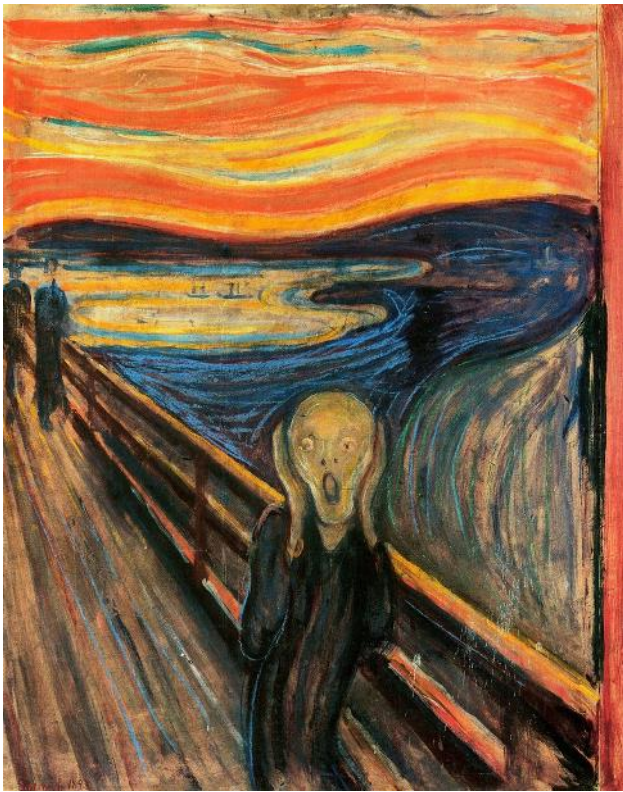


But.. in 1883





“I was walking along the road with two friends — then the sun set — all at once the sky became blood red — and I felt overcome with melancholy...I stood alone, trembling with anxiety. I felt a great, unending scream piercing through nature”

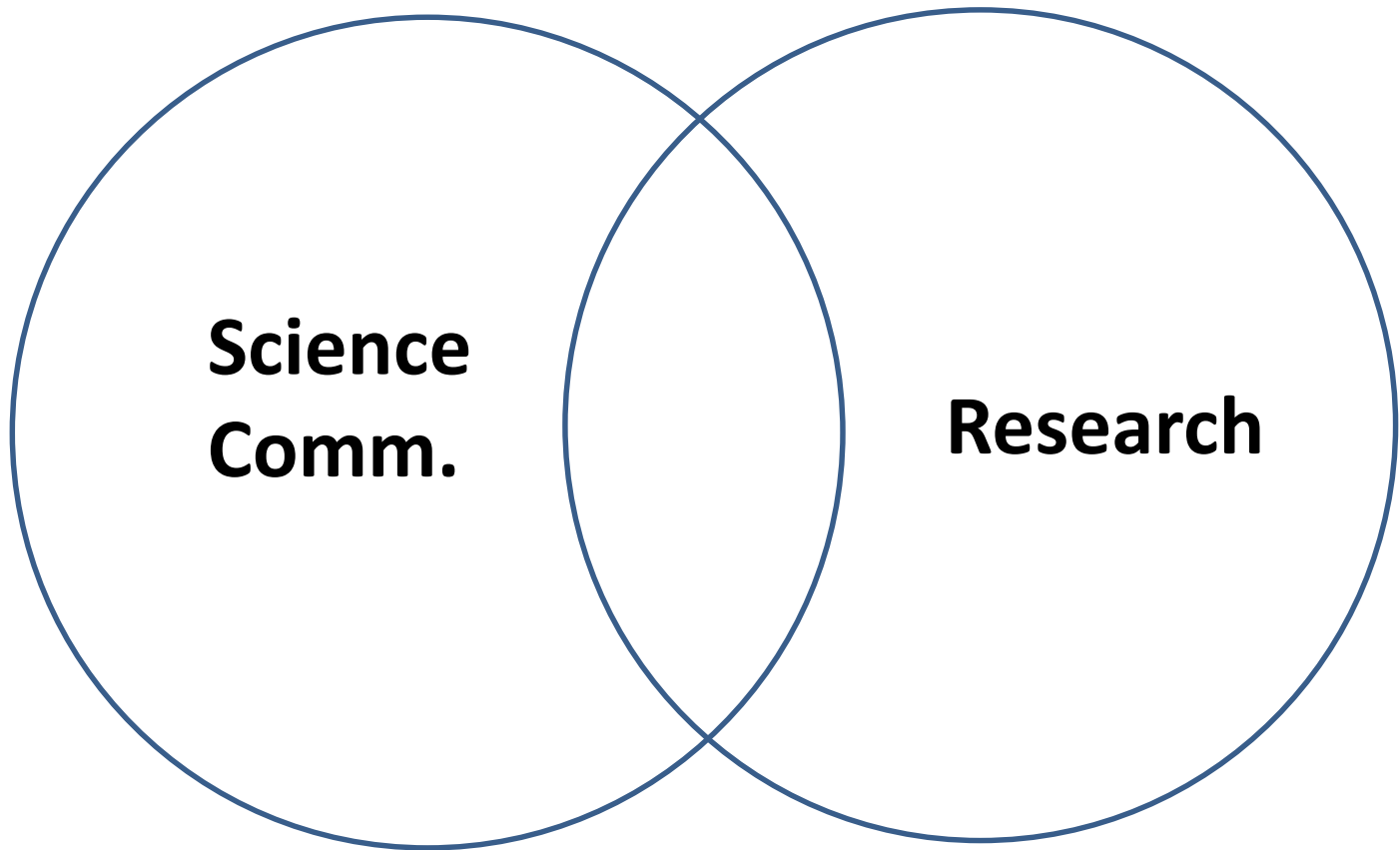


THE ROYAL SOCIETY



Mass Participatory Citizen Science

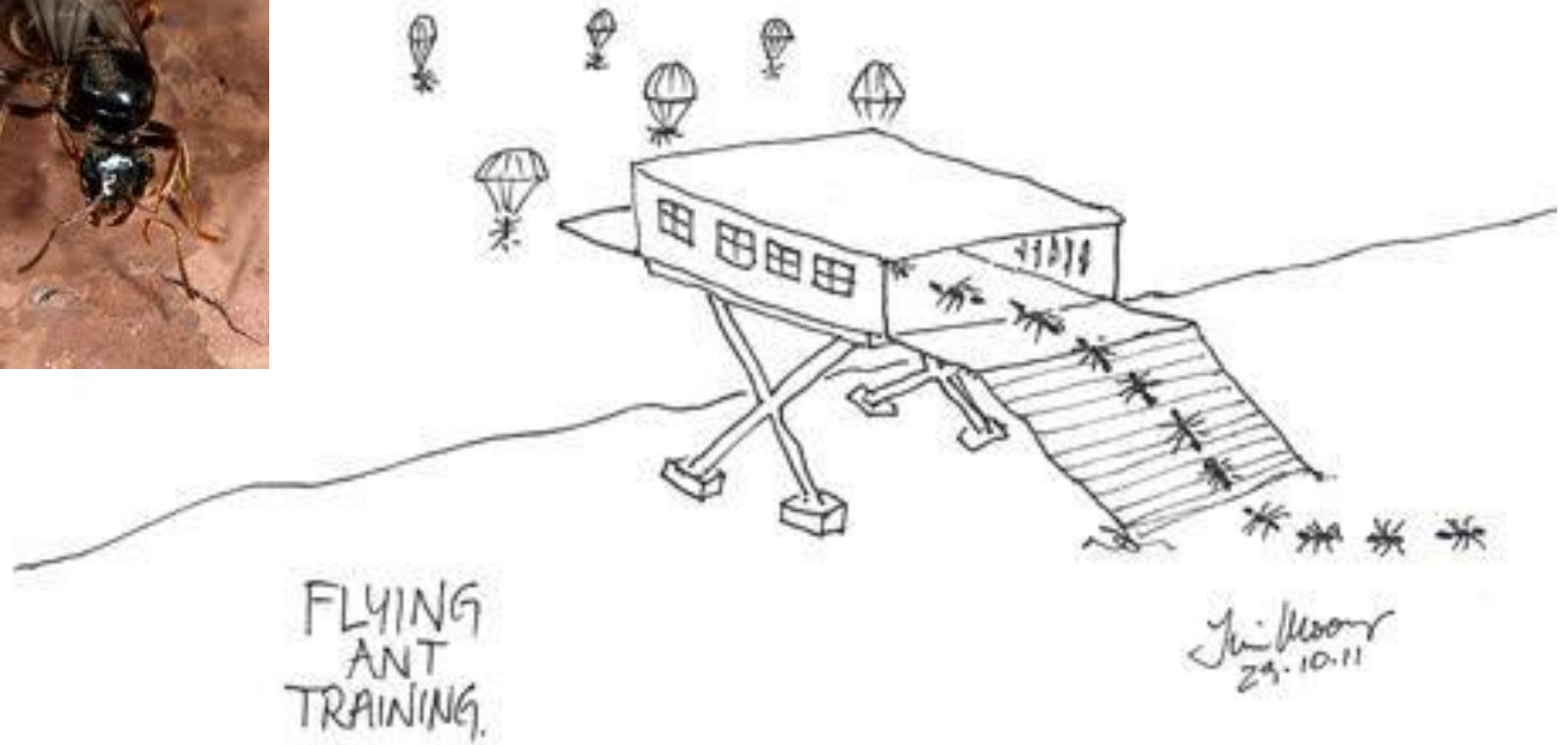
- Professional-led project
- Relatively simple, straightforward task(s)
- No training (or very little) required for participants
- Education/engagement potentially also important



**Science
Comm.**

Research

The Flying Ant Survey

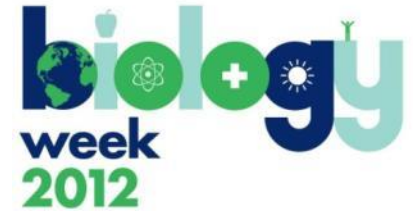


April 4th 2012



“The plan is rather ambitious, with a short timescale and a low budget, but we would love to have an ecology project of some sort. One idea was to run a citizen science project over the summer, and present the results during the October Biology Week (15th-19th). Is there a citizen science project you’d be interested in talking about?”

BIOLOGY WEEK



Flying ants plague London

Flying ants harassed Londoners trying to enjoy the sunshine today as the insects swarmed in their millions.

Related Tags: London | ant | brain | ants | Juan Cobitis

Every year during what's known as 'flying ant day', the insects gather in huge numbers when queen ants emerge to start a colony.

The ideal conditions for swarming are hot and muggy days like today.

Reports have been flooding in on Twitter from Londoners who've been surrounded by the winged beasts.

More: World's horrible-est insect swarms

User becarothwell complained: 'Damn flying ants everywhere in Camden today! Got back from lunch and found one inside my bag! Urgh, I hate them so much.' And xkatieb said: 'Ew. I feel all itchy now after the attack of the flying ants. shower time! :)'

Ant facts:



Flying ants are just like this one, but with wings (Photo: Getty)

Flying Ants Swarm London on 'Flying Ant Day'

by Amy Judd | July 19, 2010 at 08:13 am

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Swarm Intelligence

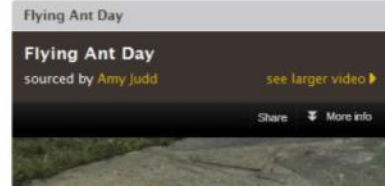
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1376 views | 0 Recommendations | 0 comments

'Flying Ant Day' July 19 Lived Up to its Name When Thousands of Londoners Reported Being Swarmed By the Flying Insect

Unofficially known as 'Flying Ant Day', it is a day when millions of flying ants meet in the air over London to mate and wreak havoc on the city's inhabitants.

Residents and visitors took to their *Twitter* account to speak of attacks of Biblical proportions:



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Why are there so many flying ants?

WHO, WHAT, WHY?
The Magazine answers...

Swarms of flying ants have descended upon some parts of the UK over the past few days, only to disappear just as suddenly. Why?

Over the past few days, the phrase "ants in your pants" could be taken literally as the air filled with ants flying en masse, landing on laundry, dropping onto heads and basking on pavements.

Entomologists say the sudden emergence of the black garden ants - known as *Lasius Niger* - is the insects' annual mating ritual.



Flying ants engage in their airborne mating ritual once a year

Enlarge Image



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Flying ant season begins

23 July 2010

The brief season for flying ants has begun in parts of the UK. But where have they come from? And what are they doing?

In the UK, these winged insects are the sexually mature queens and males of the common black ant, *Lasius niger*. They are known as alates.

This annual swarming event usually occurs from early to mid July and coincides with a period of hot and humid weather.

Over the last few weeks worker ants have been preparing for this event, which lasts only a few days, and you may have seen heaps of soil appearing above their nests.

The alates emerge from the nest each year and take flight. They aren't interested in people or picnics, however, they are just looking for a mate.

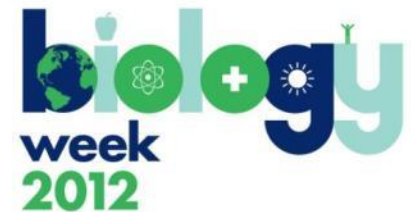
The large winged females and the smaller winged males are often seen flying joined together and this is known as **the nuptial flight**.

Once they've mated, the role of the males is over. The mated queens quickly shed their wings and begin looking for a suitable site to nest and make a new colony of their own.



Ant nuptial flights:

- Spectacular
- Memorable
- Occur reliably
- Hard to confuse with anything else
- Media-friendly
- Of interest to the general public
- Occur at the right time



Ideal for a Citizen Science project...

Aims

- Publicise Society of Biology and Biology Week!
- Collect useful data on *Lasius niger* nuptial flights
 - Is there any such thing as “flying ant day”?
 - How synchronised are these flights spatially?
 - Are there patterns to their occurrence?
 - How closely can we link “eruptions” to weather?
 - Do multiple flights occur in the same place?
- Educate the public about ant biology
- Raise awareness of biology and ecology in general



SurveyMonkey.com
because knowledge is everything

Flying Ants

* 1. When did you see your flying ants? Please enter date and time.

Date and time / / : -

* 2. Where were you? Please enter a postcode (with a street address if you have it) or a grid reference. More detailed descriptions are welcome in question 3.

3. What was the habitat?

- Garden
- Road or paved area
- Fields
- Woodland
- Inside a building or greenhouse

Other (please specify)

4. What was the weather like?

- Sunny
- Sunny spells
- Overcast
- Drizzle
- Rain

Other (please specify)



Next



6 July 2012 Last updated at 03:33



UK's flying ant swarms are counted

By Matt Bardo

Reporter, BBC Nature



ANTWEB.ORG

Scientists are attempting to count the number of places flying ants appear in the UK, as they swarm across the country during mating flights.

"By running the flying ant survey we can learn more about the ecology and behaviour of ants," said Dr Mark Downs, of the Society of Biology.

The charity aims to shed new light on the reasons they appear all over the country at the same time.

The results will be announced during National Biology Week in October.

The seasonal appearance of flying ants occurs when they embark on their "nuptial" or "mating" flight, in the first step to founding a new colony.

Related Stories

[Why are there so many flying ants?](#)

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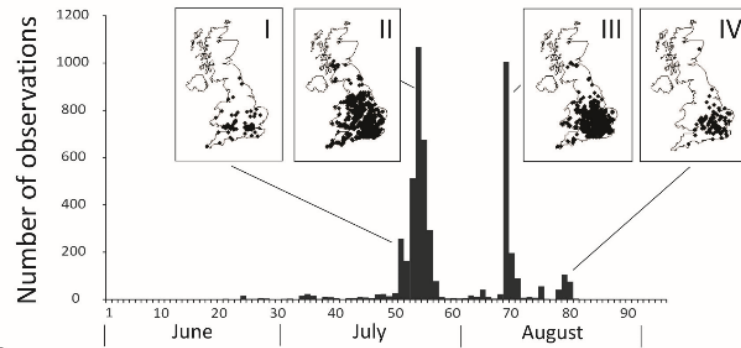
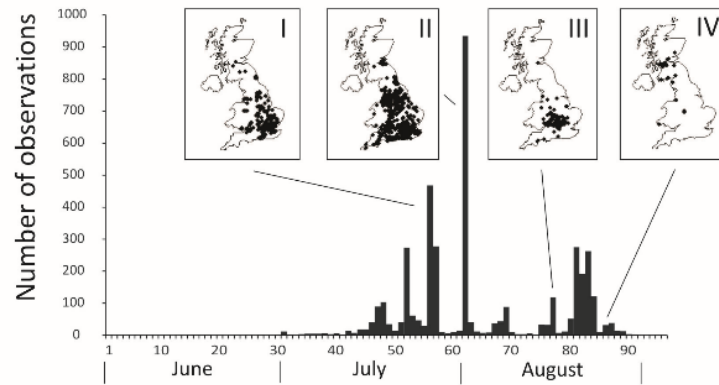
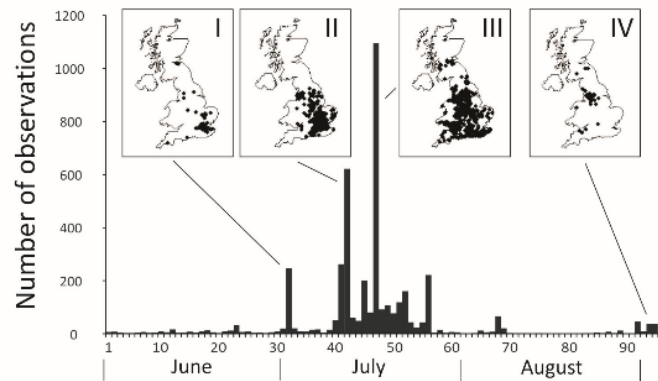
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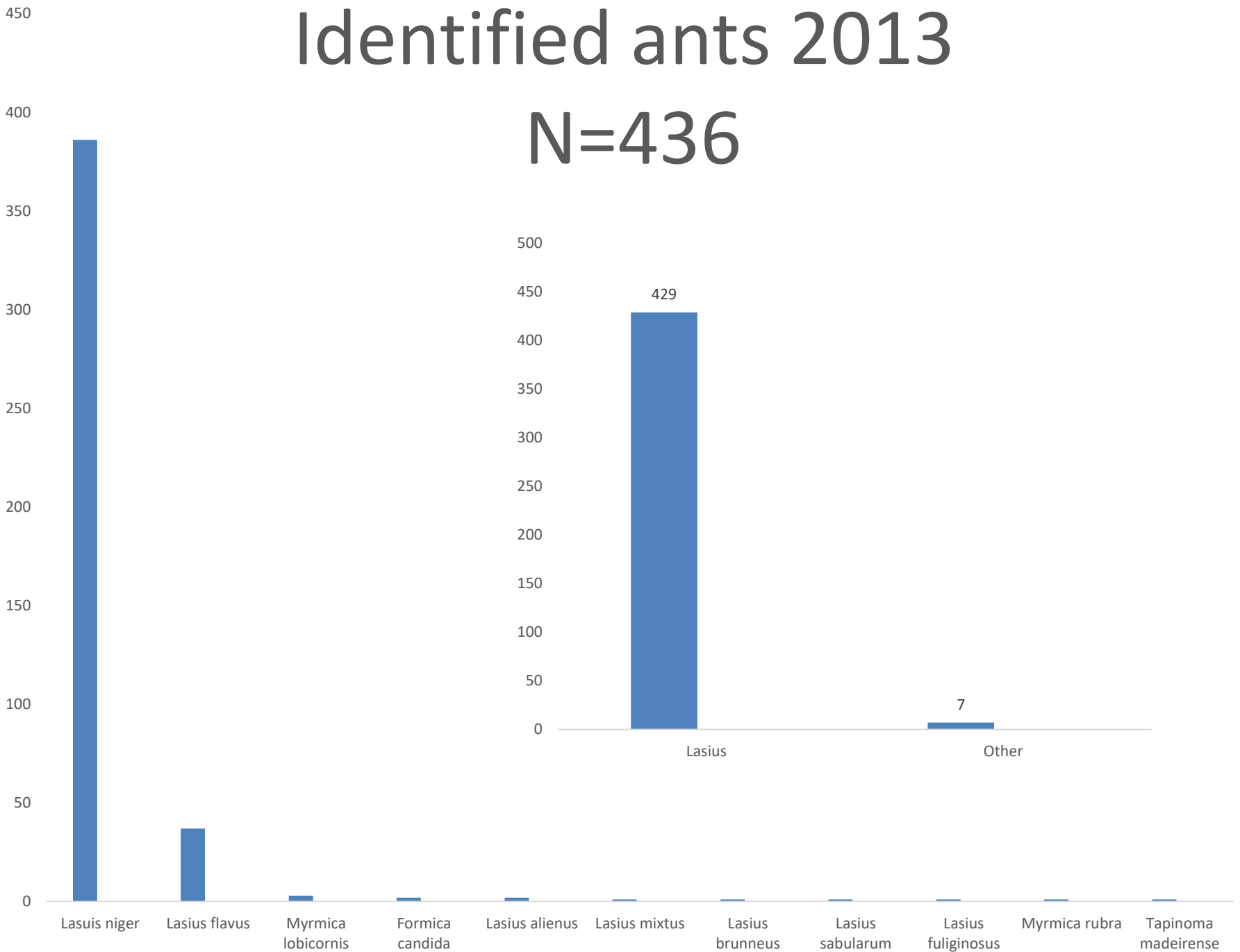
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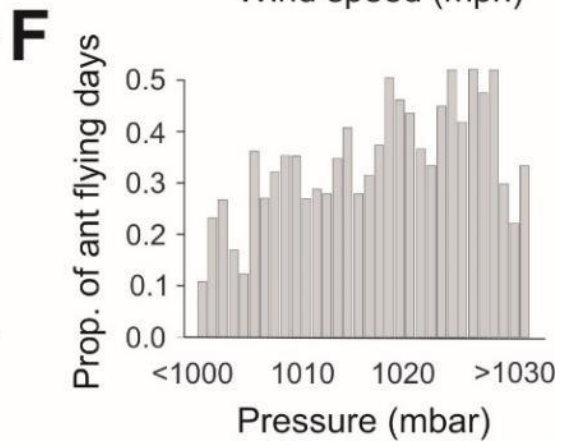
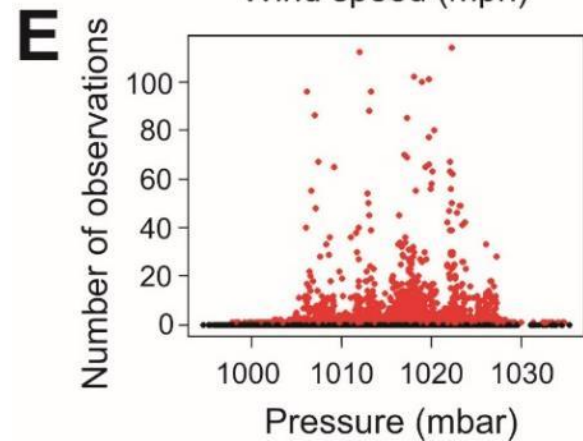
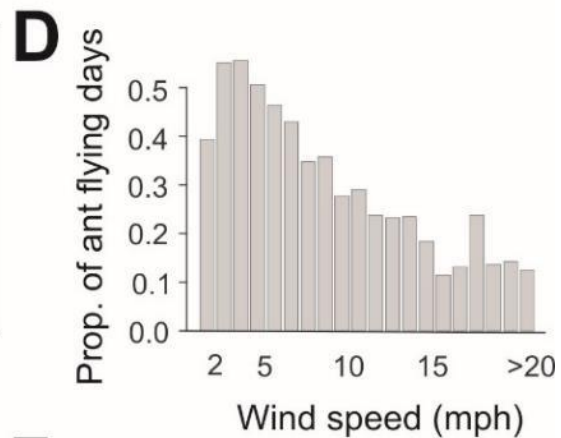
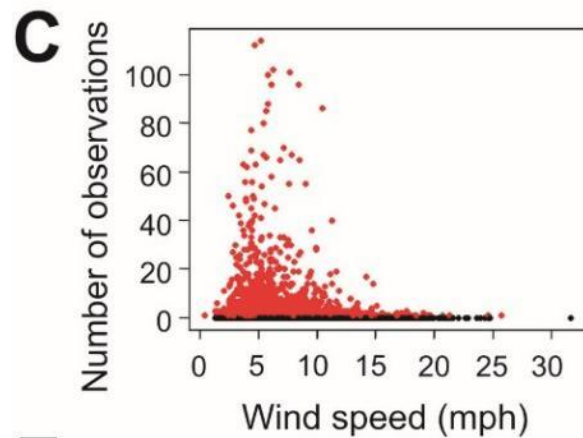
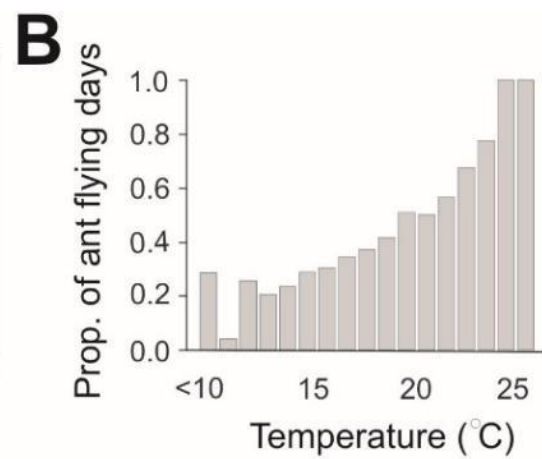
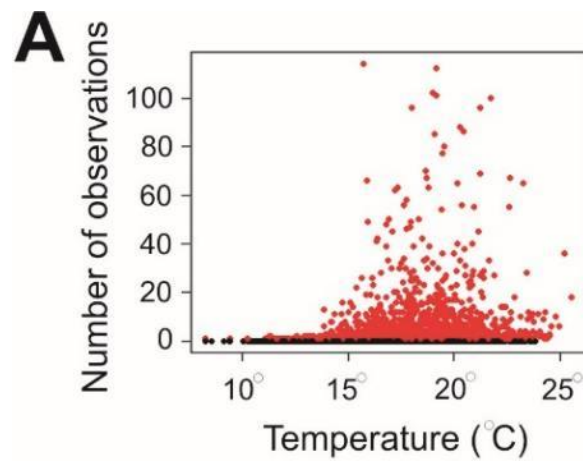
Narrated by Sir David Attenborough this is a stunning collection of videos from the original Planet Earth series.

A**2012****B****2013****C****2014**

Identified ants 2013

N=436







Ecography 40: 001–011, 2017

doi: 10.1111/ecog.03140

© 2017 The Authors. *Ecography* © 2017 Nordic Society Oikos

Subject Editor: Jens-Christian Svenning. Editor-in-Chief: Miguel Araújo. Accepted 7 July 2017

The spatial distribution and environmental triggers of ant mating flights: using citizen-science data to reveal national patterns

Adam G. Hart, Thomas Hesselberg, Rebecca Nesbit and Anne E. Goodenough

- The public will take part
- Some will “super engage”
- You can publish decent science from CS studies
- Advertising is everything!

Spider Survey

- App-based; also web-based (Survey Monkey)
- App – basic info and recording portal
- Recorded:

Date

Time

Location

Sex of spider

Location within house





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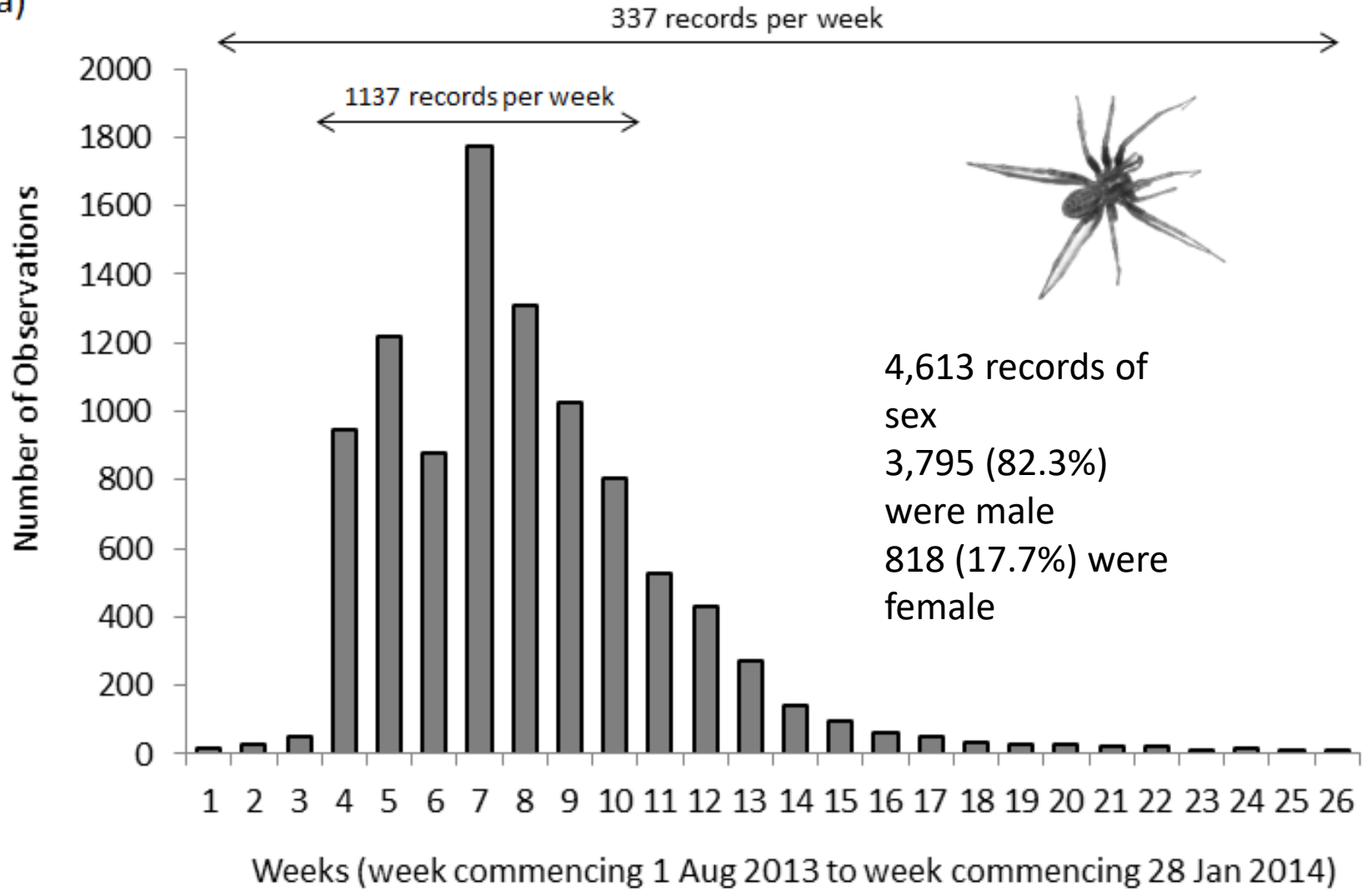
ATTACK OF THE GIANT SPIDERS: Scorching summer leaves beasts poised to INVADE Britain

GIANT spiders are poised to invade Britain, scientists warned last night.

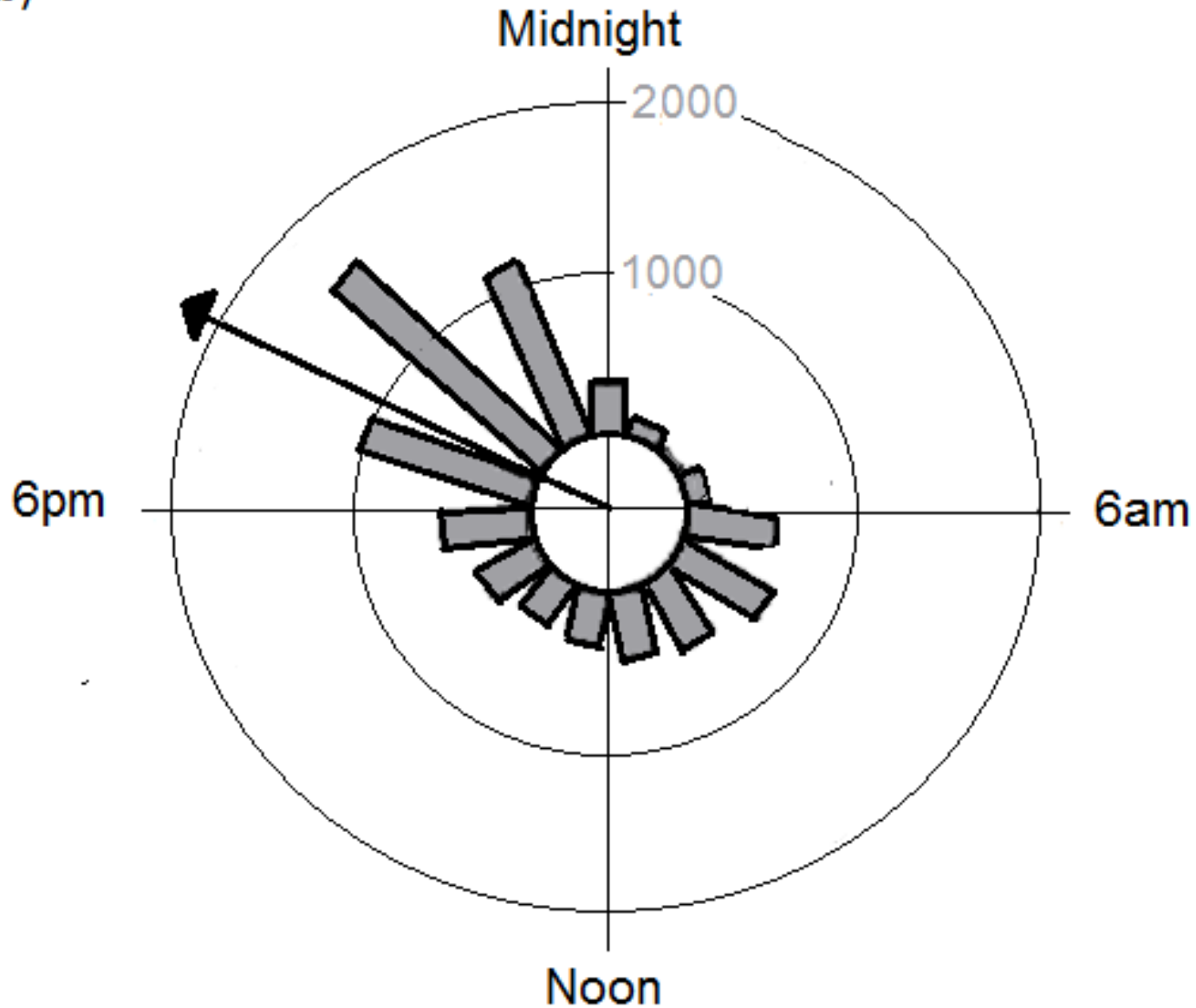
Spider Survey

- 50,000+ app downloads
- 10,268 records within the study period
- app = 8,636; SurveyMonkey = 1,632
- 363 were removed...
- N = 9,905
- None were identified unambiguously to species...None...Not a single one...

a)



b)



Living rooms: mean=19:36 (19:21-19:51 95% CI); Bedrooms: mean=19:47 (19:18-20:15 95% CI); Watson-Williams F-test: $F=0.665$; $df=1, 3611$; $p=0.415$ (Batschelet, 1981)

Arachnology

Published by: **British Arachnological Society**

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Arachnology 17(7):331-334. 2018

<https://doi.org/10.13156/arac.2017.17.7.331>

Spatiotemporal Variation in House Spider Phenology at a National Scale Using Citizen Science

[Adam G. Hart](#), [Rebecca Nesbit](#) and [Anne E. Goodenough](#)

- Human behaviour can be a big factor in your observations
- Species ID may be tricky – or impossible



the Big Wasp Survey

*Harnessing the power of the UK public
to help scientists better understand
the much misunderstood wasp!*





Science

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Public urged to drown wasps in beer in bizarre conservation project, condemned by wildlife experts



19



The Big Wasp Survey is urging members of the public to make wasp traps out of beer

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Conservationists slam 'hateful' survey promoting wasp killing

Big Wasp Survey encourages volunteers to build homemade traps and send dead wasps to entomologists to monitor populations

Patrick Barkham

@patrick_barkham
Wed 23 Aug 2017 17:51 BST

f t e < 346 437

This article is over 1 year old



▲ 'This is about raising public awareness of these much-maligned insects,' say the founders of the wasp survey.

Science & Environment

What's really the point of wasps?

By Prof Adam Hart
University of Gloucestershire

© 25 August 2017



GETTY IMAGES

A new citizen science survey aims to shed light on that fixture of summertime in the outdoors: the wasp. Though much maligned, these fascinating creatures perform a vital ecological role, say scientists.

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Inside the killing jar



Why do entomologists kill so many insects? Professor Adam Hart discusses the ethics of entomology collections

Data collected over 2 weeks by public, specimens sent for expert identification (1294 locations; 6680 wasps),

Compared with a four-decade dataset established by the Bees, Wasps and Ants Recording Society.

The citizen science data were significantly less spatially biased than the long-term data, but were more urban-biased.

Species distribution modelling showed that just two weeks of citizen science generated coverage comparable to more than four decades of expert recording.

“Overall, we show that citizen science can be an extremely powerful and robust method for mapping diversity and distributions. We suggest that cautious combination of citizen science with valuable long-term expert surveying could be a highly reliable method for monitoring biodiversity”



The Future

Making more complex use of citizens

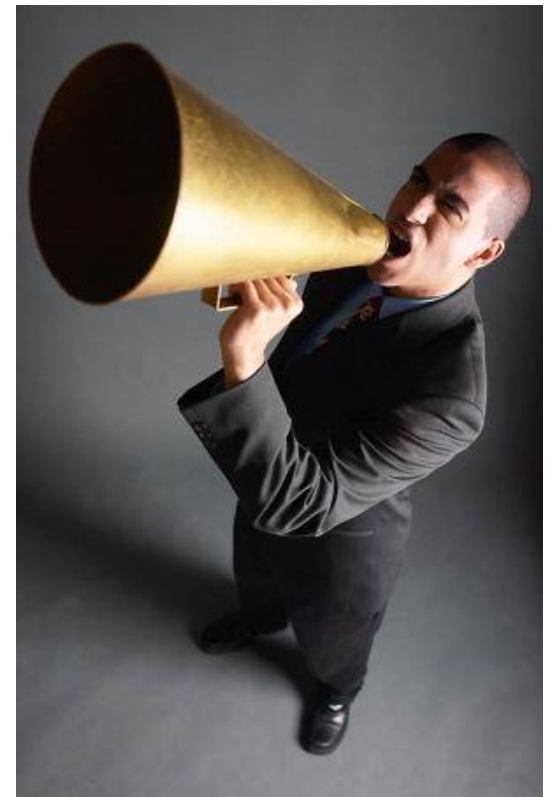
Different levels of engagement

Directed action

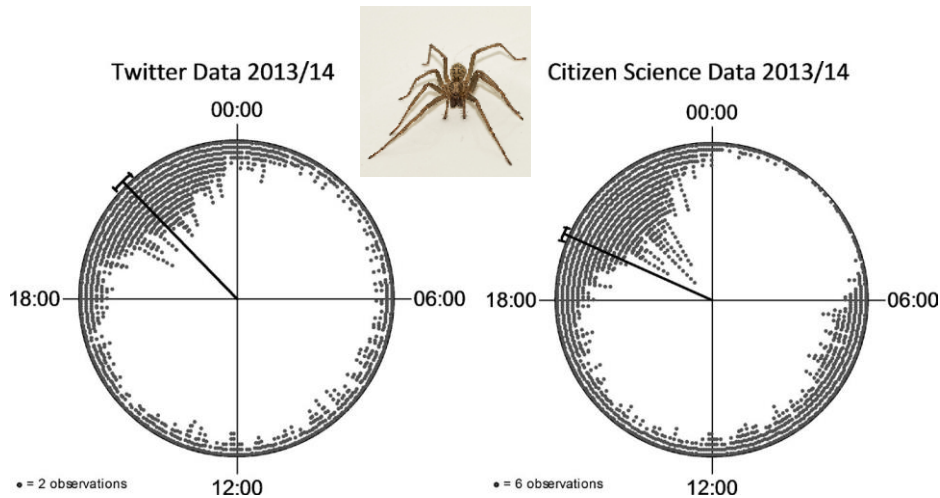
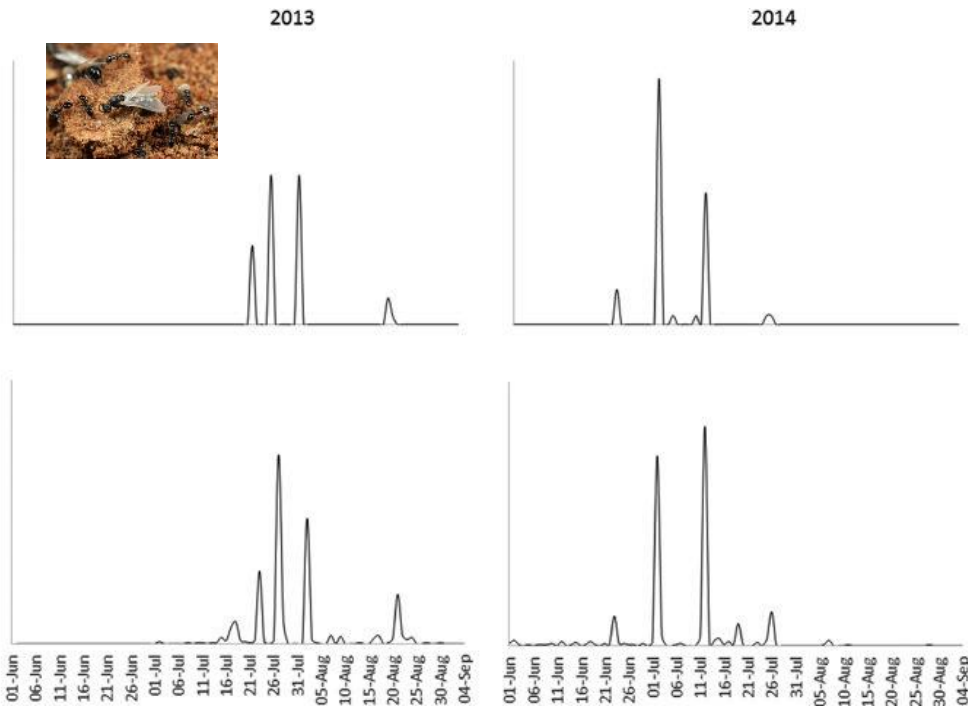
“Passive” Cit Sci...



twitter 



#



RESEARCH ARTICLE

Testing the potential of Twitter mining methods for data acquisition: Evaluating novel opportunities for ecological research in multiple taxa

Adam G. Hart, William S. Carpenter, Estelle Hlustik-Smith, Matt Reed, Anne E. Goodenough

First published: 04 September 2018 | <https://doi.org/10.1111/2041-210X.13063>

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'Twitter mining' for ants, spiders and birds

By Jonathan Amos
BBC Science Correspondent

6 September 2018

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Scientists want to understand the influence of the environment on insect activity

Twitter is set to become a very useful resource in the study of certain animal behaviours, scientists say.

Conclusions

- Citizen Science can generate useful, hypothesis testing science
- It can also generate useful monitoring data

BUT

- Combination approaches work best if species ID is important
- “Helping” isn’t always helpful – the limits of CS are important to consider!

