

BBC

PURPLE EMPEROR BRITAIN'S GLADIATOR BUTTERFLY



July 2012 £3.80 US \$8.25 CAN \$10.95  
Volume 30 Number 7

# Wildlife

## Size matters

NEW RESEARCH

Why bigger is better for male fox cubs

PLUS

### The mystery turtle

Unravel the surprising secrets of Australia's flatback turtle

### Discover Patagonia

Meet pumas, guanacos and condors in Chile's wildest park

### Can we save the whale?

The biggest perils facing cetaceans – and how they can be averted

ALSO INSIDE

STORM PETRELS

AFRICA'S LITTLE FIVE

METAMORPHOSIS

WILD BORNEO





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THIS MONTH'S  
CONTRIBUTORS

## STEFANO UNTERTHINER



Discover  
Patagonia,  
p23

Stefano  
always  
dreamed of

working in Patagonia, one of the world's last great wildernesses. He says, "Meeting a puma was an unforgettable experience."

## KIERAN MULVANEY



Can we save  
the whale?  
p42

Kieran has  
been writing  
about

cetaceans since 1985. "You haven't lived until you've been in a small boat in the Antarctic surrounded by 100 minke whales," he says.

## DOUG PERRINE



The mystery  
turtle, p58

During his  
mission to  
photograph all  
of the world's

species of sea turtles, Doug has fended off the advances of an amorous green turtle, and watched a killer whale devour a leatherback.

## MATTHEW OATES



Purple  
emperor, p64

Matthew  
works for the  
National Trust,  
helping people

get closer to nature, and has a passion for butterflies. "The purple emperor reaches parts other species cannot reach," he says.

ON THE COVER  
THIS MONTH...

Red fox cub (captive)

PHOTOGRAPH BY

JANE BURTON/DKIMAGES.COM

INSET Dan Cole/The Art Agency

Cheryl-Samantha Owen



## Welcome

Praying for rain – that's what we're all doing here at *BBC Wildlife*. An odd sentiment, you might think, given the soggy spring. But we're rooting for a wet July – because it is crucial to the success of this year's fox cubs.

July is the month when you are most likely to be approached by a youngster begging for food, or see a lost-looking cub in an unexpected spot, scavenging for scraps. These pitiful pups are driven to wander streets and parks by hunger – their parents have now stopped providing them with food and they have yet to master the art of hunting for themselves.

Only by finding and eating plenty of worms now, at this key developmental stage, will male fox cubs grow up to be big, strong and successful. And earthworms are only easy to catch during rain, when they rise to the surface within reach of small paws – hence our meteorological hope.

In this issue, Professor Steve Harris reveals new research telling an astonishing story of favoured sons and doting mothers, and highlights the fact that, no matter how hard a vixen works to give her male offspring the best start in life, success ultimately depends on the unpredictable British weather (p46).

“

July is the month when you are most likely to be approached by a fox cub begging for food.”

Also this month, Stefano Unterthiner shares his breathtaking photos of the rich wildlife of Chile's wildest national park (p23); Kieran Mulvaney examines the threats faced by the world's whales (p42); and photographer Doug Perrine uncovers the secrets of Australia's forgotten turtle, the extraordinary flatback (p58).

Plus Matthew Oates organises a picnic of poo and rotting fruit for a very special British butterfly, the purple emperor (p64); Stephen Mills searches for Africa's Little Five (p55); and we reveal how caterpillars miraculously turn into butterflies (p92).

Finally, due to popular demand, *Tales from the Bush* makes a welcome return, kicking off in style with an unexpected botanical discovery on an Essex nature reserve (p114). Enjoy the issue!

Sophie

Sophie Stafford, Editor

## HOW TO GET IN TOUCH



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# contents

JULY 2012

## WILD British wildlife to enjoy this month

- 6 SPECIES & HABITATS** City-centre peregrines, gatekeeper butterflies and Britain's surprisingly rich shingle shores. Plus an ID guide to flowers that have escaped our gardens.
- 13 YOUR LOCAL PATCH** Spectacles to enjoy in your garden: zebra jumping spiders.
- 15 🐾 THINGS TO DO** Monitor the health of your local road verges, go on a dragonfly safari and be enthralled by the cries of storm petrels.

## AGENDA News, conservation & analysis

- 38** Sri Lanka's road to ruin, one boy's idea to help lions, and Mark Carwardine on whale sharks.
- 42 🐾 ANALYSIS SPECIAL** Can we save the whale? Discover the current threats against cetaceans, and efforts to protect them.

## W2 Essential information & expert advice

- 79 TV & RADIO** We preview a BBC radio programme about Malta's bird hunt, and reveal how pike were filmed for *Springwatch*.
- 83 BOOKS** July's best reads, and Tony Soper discusses his favourite book.
- 87 Q&A** Your questions answered, plus the latest discoveries and fascinating facts.
- 92 🐾 THE BIG QUESTION METAMORPHOSIS**  
How does a caterpillar turn into a butterfly?

## REGULARS

- 19 RICHARD MABEY**  
**A BRUSH WITH NATURE**  
Do other creatures share our aesthetic sense?
- 21 BILL ODDIE WILD AT HEART**  
How wildlife was filmed in the good old days.
- 36 SUBSCRIBE** Save 35% on the cover price.
- 95 YOUR LETTERS**
- 101 YOUR PHOTOS**
- 104 CROSSWORD**
- 114 TALES FROM THE BUSH**  
It's back! Our popular section returns.



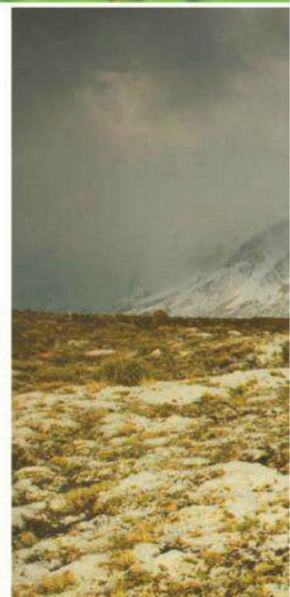
46

**SIZE MATTERS**  
Why July is make-or-break month for Britain's fox cubs – especially males.

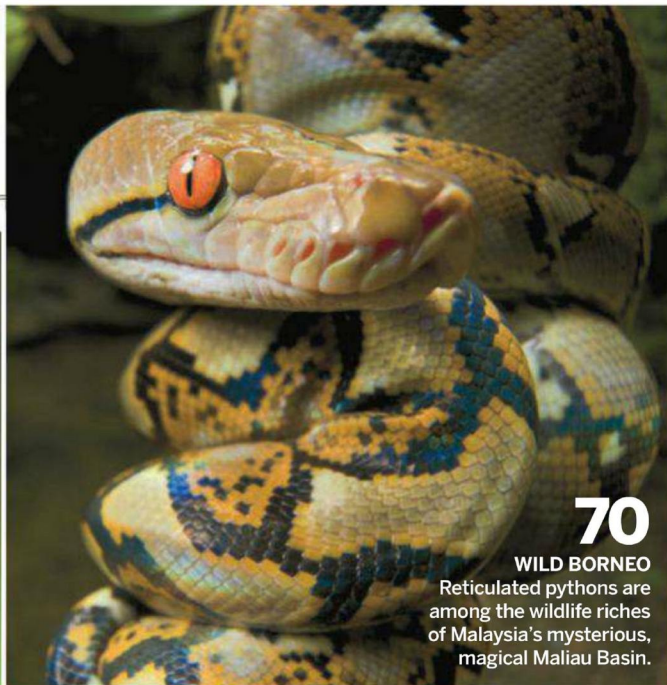


64

**PURPLE EMPEROR**  
"His Imperial Majesty" has a unique standing in our natural history, country lore, literature and verse."  
Matthew Oates

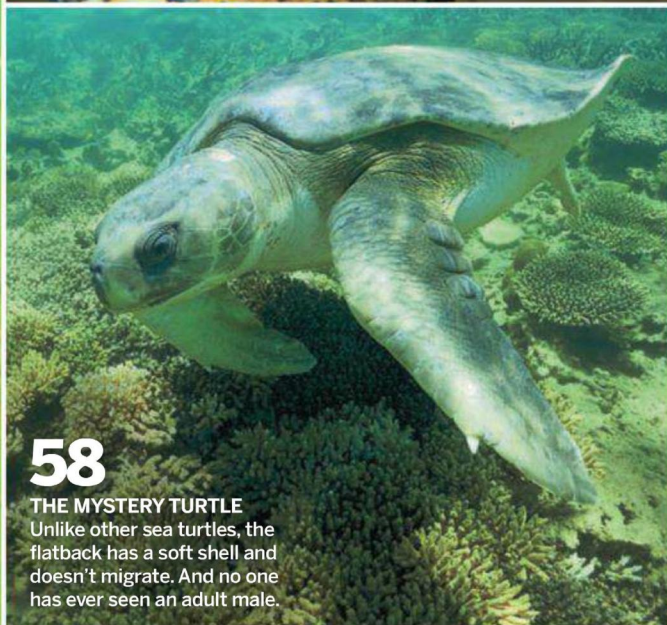






70

**WILD BORNEO**  
Reticulated pythons are among the wildlife riches of Malaysia's mysterious, magical Maliau Basin.



58

**THE MYSTERY TURTLE**  
Unlike other sea turtles, the flatback has a soft shell and doesn't migrate. And no one has ever seen an adult male.



23

**DISCOVER PATAGONIA**  
Gorgeous photos of one of the planet's last great terrestrial wildernesses.

## cover story

### FEATURES

#### 23 **PORTFOLIO** **DISCOVER PATAGONIA**

Stefano Unterthiner's breathtaking pictures celebrate the spectacular wildlife of Chile's Torres del Paine National Park, from secretive pumas to fleet-footed guanacos.

#### 46 **SIZE MATTERS**

Fox expert Steve Harris shares new research into why sexual politics – and this summer's weather – will determine how big cubs grow.

#### 55 **AFRICA'S LITTLE FIVE**

Seen the 'Big Five'? Meet their diminutive counterparts: leopard tortoise, buffalo-weaver, rhino beetle, elephant shrew and antlion.

#### 58 **THE MYSTERY TURTLE**

Top underwater photographer Doug Perrine tracks down Australia's flatback – the strangest, rarest and least-known sea turtle in the world.

#### 64 **PURPLE EMPEROR**

Feisty, fussy and fond of (ahem) faeces, this lovely insect should be our national butterfly. Matthew Oates explains why he's smitten.

#### 70 **WILD BORNEO**

Nick Garbutt explores the remote and beautiful Maliau Basin, home to pythons, pitcher plants, bearded pigs and other exotic species.

#### 76 **EXPOSURE TALON CONTEST**

Staffan Widstrand photographs an aerial scrap between rival white-tailed eagles.

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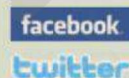
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Britain's leading fox expert Steve Harris joins us to talk about this carnivore's fascinating behaviour.

► [www.discoverwildlife.com/podcasts](http://www.discoverwildlife.com/podcasts)



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Clockwise from top left: Andrew Parkinson/pspb-images.com; Nick Garbutt; Doug Perrine; Stefano Unterthiner; Hugh Clark/FLPA





PEREGRINE

# The people's falcon

Flagging the success of its species, a juvenile peregrine falcon scythes through the airspace over London's Houses of Parliament. Once confined by pesticides and persecution to remote crags, this predator has made a stunning comeback and is rewarding us by moving into city centres. From Aberdeen to Plymouth and Cardiff to Norwich, urban peregrines are now pursuing their prey, bearing it in sulphur-yellow talons to squealing chicks hunched on vertiginous ledges. The young may be out of sight, but we can follow their lives on webcams and watch the adults and fledged juveniles from manned information points. It's a glorious public celebration of our fastest creature – a standard-bearer for Great British conservation.

► Follow the peregrines of Bath and Cheltenham in Springwatch, on BBC Two now.



by **Brett Westwood**  
BBC radio presenter and naturalist

Bertie Gregory/2020VISION/naturepl.com





# wild july

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## THREE TO SPOT

### DRAGONFLIES



Dave Bevan

▲ July is the month when many 'big guns' of the dragonfly world are on the wing. The **BROWN HAWKER** has telltale bronze wings and wanders widely, often appearing in gardens (it has a miraculous ability to find newly dug ponds). Strangely, the species is absent from much of Wales and south-west England.



Laurie Campbell

▲ On moorlands and damp heaths in the west and north of the UK, a rustling of wings along streams and rivulets may betray a patrolling **GOLDEN-RINGED DRAGONFLY**. One of our largest species, it has magnificent waspish markings and apple-green eyes. Its habit of resting frequently makes it a popular photographic subject.

▼ The **SOUTHERN HAWKER** is a bold insect, often coming up close to inspect you along woodland rides and canalsides. Both sexes have bold green markings, though the males turn bluer as they age. This species tends to fly low and is active even in dull conditions and as late as dusk.



Steve Round



Steve Round

The gatekeeper is a classic species of high summer. Look out for it as part of this year's Big Butterfly Count, the world's largest survey of butterflies.

## THE BIG BUTTERFLY COUNT

# Gatekeeper on the up

All hail the gatekeeper, which topped the annual Big Butterfly Count in 2011. In the nature-watcher's calendar, the species' arrival is a sure sign that high summer is here: the sight of the first of these tawny-orange butterflies jostling over flowering bramble patches in late June or early July tells us that the season has turned.

More than 52,000 sightings of gatekeepers were submitted to the popular Butterfly Conservation survey last year, beating small and large whites into second and third place, respectively, in the abundance stakes. In recent years this species has been steadily spreading north: its distribution now extends throughout England and Wales, and it may be poised to colonise south-west Scotland.

Gatekeepers are also known as hedge browns or 'hedge eyes', and are conspicuous in country lanes, roadsides, rough downland and, increasingly,

older gardens. They're slightly smaller and much brighter orange than meadow browns (see p13), and, unlike that species, both sexes have double white eye-spots on each forewing.

Colonies of gatekeepers are appearing more frequently in towns where gardens and roadsides aren't manicured too severely: another reason, no doubt, for their rise in the Big Butterfly Count rankings. Shrubby areas are essential – their favourite spots are sheltered hedges, at the base of which they lay their eggs. When the small grey caterpillars hatch, they eat their egg casings, crawl off and start feeding on a wide range of grasses.

► This year's survey runs from 14 July to 5 August.

To take part, visit [www.bigbutterflycount.org](http://www.bigbutterflycount.org) or phone Butterfly Conservation on 01929 400209.

► National Insect Week runs from 25 June to 1 July. Find out more from [www.nationalinsectweek.co.uk](http://www.nationalinsectweek.co.uk)



## HABITATS OF THE BRITISH ISLES

# Shingle beaches

As waves pound our coasts, polishing and sorting boulders and pebbles, they create ridges, driving the larger stones towards the top. In places, ridges formed offshore grow to enclose lagoons such as the Fleet, guarded by the magnificent stretch of Chesil Beach. Elsewhere, countless pebbles are shifted by waves into 'nesses' – as at Dungeness, the largest area of shingle in the UK.

In all, almost 500km of coastline in England and Wales consists of shingle. It may look arid, but this habitat has its fair share of wildlife specialities. In more stable areas, there are flowering plants such as sea pea, sea kale and yellow horned poppy. Breeding birds include ringed plovers and a trio of terns – little, common and Arctic – whose shrill cries fill the salty air.



## FIVE TOP SPOTS

Search the landward side of shingle ridges for plants, taking great care not to disturb nesting plovers or terns.

### 1. CEMLYN, ANGLESEY

Shingle bar and lagoon, with a tern colony and sea kale. Access to colony restricted in breeding season, but viewing is good.

### 2. ORFORD NESS, SUFFOLK

Saltmarsh and lagoons, plus a spit – Shingle Street. Wide range of birds and shingle plants.

### 3. DUNGENESS, KENT

Huge expanse of new and well-established shingle with a rich flora and nesting terns.

### 4. CHESIL BEACH, DORSET

Dramatic 28km ridge enclosing the Fleet. Shingle flowers, terns and ringed plovers.

### 5. SLAPTON BEACH, DEVON

Shingle beach between the sea and Slapton Ley. Wide range of flowers in the older shingle.

No flower is more closely associated with shingle than the yellow horned poppy, which thrives on shores lashed by winds and salt spray. It blooms from June to August.







## SPOTTER'S GUIDE

# Floral fugitives

If you get the urge to gather a guilt-free garland of colourful midsummer blooms, these garden escapes may fit the bill. Conservationists have concerns about the worst non-native bullies such as Spanish bluebell, Himalayan balsam and Japanese knotweed, but the dozen we've picked are mostly benign.

The most obvious species illustrated here is probably red valerian, originally from the Mediterranean and now a very familiar sight on walls, decrepit buildings and cliffs. Meanwhile, South African montbretia often crops up in tourist brochures celebrating the 'traditional' Cornish countryside.

Some of these floral fugitives, such as evening primrose and purple toadflax, are natural escape artists, leapfrogging our garden boundaries as seed. Others, including soapwort and dotted loosestrife, loiter near lay-bys on the edge of town – a sign of botanical fly-tipping.

Bear in mind that introducing non-native plants into the wild is not recommended – and, in the case of 38 of the most invasive 'Schedule 9' species, illegal.

### ▶ HOW TO GET INVOLVED

- **Monitor local colonies** of alien perennials (those that live for over two years) to see how they spread.
- **Report garden escapes** that you suspect may be unusual at [www.bsbi.org.uk](http://www.bsbi.org.uk)
- **Discover more about** invasive non-native plants in Britain at [www.plantlife.org.uk/campaigns/invasive\\_plants](http://www.plantlife.org.uk/campaigns/invasive_plants) and in the advice pages at [www.rhs.org.uk](http://www.rhs.org.uk)

### KEY

- Common and widespread
- Local: easy to see in some spots
- Scarce: searching needed



#### Montbretia ●

*CROCOSMIA X CROCOSMIIFLORA*

Native to South Africa. Patch-forming perennial of verges, hedgebanks and woods. Its spread is causing concern.



#### Soapwort ●

*SAPONARIA OFFICINALIS*

Native to mainland Europe. Patch-forming perennial of shady road verges, waste ground and riverbanks.



#### Goldenrod ●

*SOLIDAGO CANADENSIS*

Native to North America. Clump-forming perennial of waste ground and riverbanks. Popular with insects.



#### Red valerian ●

*CENTRANTHUS RUBER*

Native to Mediterranean. Perennial of cliffs, walls and old buildings. Very attractive to butterflies and moths.



#### Peach-leaved bellflower ●

*CAMPANULA PERSICIFOLIA*

Native to mainland Europe. Short-lived perennial of well-drained waste ground and railway verges.



#### Opium poppy ●

*PAPAVER SOMNIFERUM*

Native to south-east Europe and western Asia. Overwintering annual of waste ground and disturbed soil.

Flowers may also be mauve or white



#### Purple toadflax ●

*LINARIA PURPUREA*

Native to Mediterranean. Perennial of dry, well-drained soil, especially waste ground and railway sidings.



#### Dotted loosestrife ●

*LYSIMACHIA PUNCTATA*

Native to Southern Europe and Turkey. Patch-forming perennial of road verges and waste ground.



#### Rose campion ●

*LYCHNIS CORONARIA*

Native to Southern Europe, North Africa and the Middle East. Perennial in sandy places or dry waste ground.



#### Large-flowered evening primrose ●

*OENOTHERA GLAZIOVIANA*

Native to North America. Biennial of waste ground and railway sidings.

Flowers open at dusk to attract moths



#### Goat's rue ●

*GALEGA OFFICINALIS*

Native to Middle East. Clump-forming perennial of road verges, waste ground and railway banks.



#### Broad-leaved everlasting pea ●

*LATHYRUS LATIFOLIUS*

Native to Southern Europe. Perennial of hedgerows and road verges.





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 Israel Ornithological Center







by Derek Niemann  
nature diarist and author

## ZEBRA JUMPING SPIDER

# Piebald predator

**S**ummer warmth lures the original Spider-Man onto sun-kissed walls and window ledges across much of Britain. Like the comic-book hero, the zebra jumping spider has strings attached – a dab of the abdomen anchors its silk lifeline to the brickwork, before hydraulic pressure launches its legs on a hunting leap several times its own body length of 6mm. This is a tiny tarantula in both appearance and movement. Its thick, hairy legs patter and stop, patter and stop. Peer at the white chevrons of hair on its back and it will probably glare straight back, raising its head to scrutinise you with the two largest and sharpest of its eight eyes.

### FIND OUT MORE

■ Discover more about the zebra jumping spider at [www.arkive.org/zebra-spider/salticus-scenicus](http://www.arkive.org/zebra-spider/salticus-scenicus)

Zebra jumping spiders prowl walls in search of flies and mosquitoes.

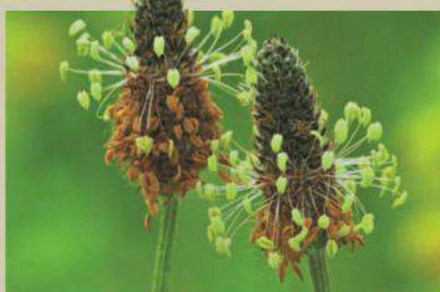


## Gardenwatch

Four wildlife highlights to enjoy on your home turf this month.



**1** Any odd-looking **COLLARED DOVES** in your garden are likely to be juveniles. They are paler than adults, and lack black neck streaks; a closer look reveals that they also have a brown (not red) iris.



**3** Even the sharpest lawnmower will not blunt **RIBWORT PLANTAIN**, which crops up in lawns as a 'weed'. Like grasses, it defies cutters by growing from the base of its spear-shaped leaves.



**2** One of Britain's most abundant butterflies, the **MEADOW BROWN** is drawn into gardens by the colour purple. Thistles and teasels are among its favourite nectar sources in flower this month.



**4** Grey-brown but far from dull, the **COMMON PLUME MOTH** has strange wings that are rolled up at rest. It turns up almost anywhere in the garden; its larvae feed on bindweed, or convolvulus.

## plant of the month

### FENNEL Hoverfly heaven

For a few weeks at the height of summer, fennel is the biggest draw in the garden for hoverflies. Several dozen at a time will sup nectar from this tall herb's pale yellow flowers. Its slender form is also appreciated by orb-web spiders, which pin their silken traps to its branched stems.

Fennel is in the umbellifer family, of which wild members include cow parsley, hogweed, ground elder and numerous other species with clustered, frothy flowerheads. It is easily grown from seed in most soils.





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edited by **Ben Hoare**  
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**WILD JULY**

species & habitats | your local patch | **things to do**



Ann & Steve Toor/NHPA

In intensively farmed areas, road verges may be the only surviving remnants of natural or semi-natural grassland.

## HELP TO PROTECT ROAD VERGES

# Flowers on the edge

**E**very summer, despairing readers write to *BBC Wildlife* to share their heartbreak over flowery road verges that have been mown to within an inch of their lives. In minutes, banks strewn with orchids and other beautiful wildflowers can be reduced to monotonous, lifeless strips of turf of little interest to insect pollinators, small mammals and other wildlife.

Councils have a responsibility to maintain highways in good condition – safety comes first. But there's no doubt that management can have an adverse impact on our road verges, which are vital 'green corridors' for wildlife as well as valuable grasslands in their own right.

Key problems include mowing too early in the year before plants have had a chance to

set seed, and leaving behind piles of cuttings, which choke delicate plants and boost soil nutrient levels so that verges are swamped by coarse grasses, nettles and cow parsley.

Plantlife hopes to raise awareness of these issues by asking us to submit records of both healthy and poorly maintained verges using an online form, so that it can help councils to protect their wildflower assets. After all, waysides are one of our most viewed habitats, giving pleasure to millions of us each day.

## HOW TO GET INVOLVED

■ To take part in the Flowers on the Edge campaign, call Plantlife on 01722 342730 or visit [www.plantlife.org.uk/roadvergescampaign](http://www.plantlife.org.uk/roadvergescampaign)

## WHAT TO DO IN ONE...

### hour

#### MONITOR YOUR LOCAL SWIFTS

Researchers need your records of screaming parties of swifts, as well as active nests and colonies, to ensure that the UK's National Swift Inventory is kept up to date. You can enter as many records as you like at different times.

► To submit records online, visit [www.rspb.org.uk/helpswifts](http://www.rspb.org.uk/helpswifts)



Mark Thomas/RSPB

### afternoon

#### JOIN A DRAGONFLY SAFARI

Wicken Fen in Cambridgeshire is a dragonfly hotspot in summer, and its Dragonfly Centre has experts on hand to help you identify these insects. It's open 11am–4pm at weekends until 26 September, and on selected weekdays during the school summer holidays.

► For more details, call 01353 720274 or visit [www.wicken.org.uk/visit\\_dragonflycentre.htm](http://www.wicken.org.uk/visit_dragonflycentre.htm)



### day

#### TAKE A WILDLIFE-WATCHING CRUISE IN THE WASH

A boat trip is a great way to see wildfowl, waders and seals in the Wash, a vast area of mudflats and saltmarsh off Lincolnshire's coast. Cruises start at Boston Marina and last about 4½ hours.

► For details of prices and to book, call 07531 495521 or visit [www.southlincsrsps.org.uk](http://www.southlincsrsps.org.uk)

Bill Ooster/FLPA

## UK STRANDINGS HOTLINE

**A NEW FREEPHONE TELEPHONE** number will make it easier for the public to report stranded cetaceans, seals and turtles. Postmortems of carcasses will provide valuable data about causes of death, as well as clues to the threats facing these animals.

► The UK Strandings Hotline is on 0800 652 0333. See also <http://ukstrandings.org>



Richard Taylor-Jones/Alamy





Mousa's broch contains a staircase leading to an open walkway at the top, from where you can enjoy beautiful views over Mousa Sound.

## WHAT TO DO IN ONE... *weekend*

# Sounds of a storm

In July, the sun sets late over Shetland. Take a midnight stroll in the lingering light to seek out our smallest seabird, the **STORM PETREL**.

like a cooling tower placed on an island nature reserve.

But the Mousa tower is ancient. It's a broch, a drystone structure from perhaps 2,000 years ago, built to house Iron Age people of status. By making both an inner and outer tower, with a staircase in between, broch builders could raise their creations to an impressive height. Scotland once had some 500 brochs – most are ruined or gone, but the one on Mousa, the finest in the world, still reaches its original height of 13.3m. And today it's Britain's strangest communal nestbox.

Once ashore, I follow a rough track that leads near a stony beach to the tower. It's after midnight, but I can still see where to step. Small waves hiss against the shore, calls of Arctic terns sound in the distance and, from the water nearby, a seal watches.

### ▶ AT A GLANCE

■ **What?** The world's smallest seabird flying on summer nights around an Iron Age broch.

■ **Where?** The island of Mousa, off the south-east mainland of Shetland.

■ **When?** May–July, around midnight.

■ **Also look for** Great and Arctic skuas (left), Arctic terns, black guillemots, and common and grey seals.



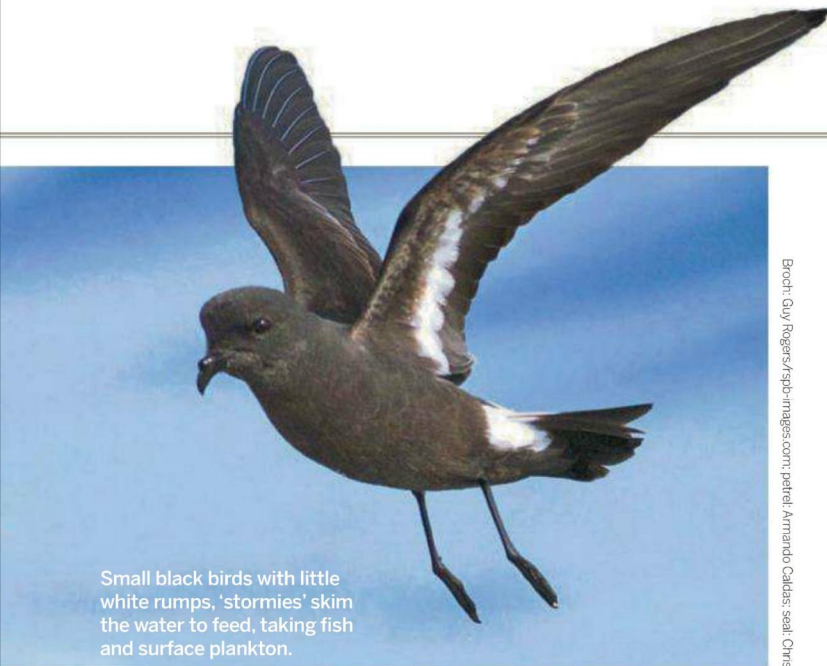
**S**immer dim – two words of Shetland dialect that should send a shiver of pleasure through anyone who understands them. 'Summer twilight' is the translation, and it refers to the period when there are barely five hours between sunset and sunrise on Britain's northernmost islands.

The reality is unforgettable. In calm weather (not guaranteed here, at the same latitude as the Gulf of Alaska), there's a softness that comes in tones of peach, purple and indigo over sky, land and water. Silhouetted shapes stand out with great clarity.

Houses, Shetland ponies, sheep, birds in flight: many sights that are commonplace by day can become objects of wonder in the hours of gentle dusk, each detail etched against the pastel heavens.

And then there's Mousa – the place that can take the *simmer dim* to another level of almost otherworldly beauty. I arrive by boat in the half-light, across the brief span of sea that separates it from the Shetland mainland, and I can't ignore an unusual building above the shore near the isle's southern end. Inked in by the artistry of the summer glow, its dark, concave shape looks





Small black birds with little white rumps, 'stormies' skim the water to feed, taking fish and surface plankton.



Common seals are easy to spot hauled out along Mousa's shoreline.

Broch: Guy Rogers/rspb-images.com; petrel: Armando Caldas; seal: Chris Gomersall/naturepl.com; puffin: Tui De Roy/Minden/FLPA; skua: Bill Ooster/ardea.com

## NOW YOU DO IT

# STORM PETRELS

## SEEING THE SPECTACLE

**MOUSA ISLAND, SHETLAND**  
01950 460800; [www.rspb.org.uk/reserves/guide/m/mousa/](http://www.rspb.org.uk/reserves/guide/m/mousa/)  
► **Mousa** is an RSPB reserve. The island lies 22.5km south of Lerwick on mainland Shetland.  
► The **broch** is in the care of

Historic Scotland ([www.historic-scotland.gov.uk](http://www.historic-scotland.gov.uk)).  
► Though some storm petrels return in late April and a few may still be here in November, **May to mid-July** is the usual season for petrel-watching trips.

## GETTING THERE

► The **Shetland ferry** sails every evening from Aberdeen to Lerwick ([www.northlinkferries.co.uk](http://www.northlinkferries.co.uk)), or fly to Sumburgh from Aberdeen, Edinburgh, Glasgow, Inverness and Orkney (<http://fi-en.flybe.com>), then hire a car (<http://visit.shetland.org>) or take a bus ([www.zettrans.org.uk](http://www.zettrans.org.uk)).  
► For the ferry across to Mousa, park beside the pier at **Leebotten** ([www.mousa.co.uk](http://www.mousa.co.uk)).

## WHERE TO STAY

**BUDGET** Islesburgh House Hostel in Lerwick, open April–October, costs from £13.75 per person. 01595 745100; [www.shetland.gov.uk/community/IslesburghHostel.asp](http://www.shetland.gov.uk/community/IslesburghHostel.asp)  
**MID-RANGE** Sumburgh Hotel (right) has singles starting from £75 and doubles from £90. 01950 460201; [www.sumburghhotel.com](http://www.sumburghhotel.com)  
**LUXURY** Lerwick Hotel offers

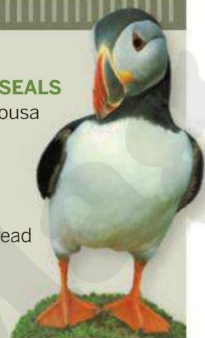


fine cuisine. Singles cost £98, doubles £120. 01595 692166; [www.shetlandhotels.com](http://www.shetlandhotels.com)

## ALSO IN THE AREA

**PUFFINS** (right) can be seen both in the flesh and via burrow-linked 'PuffinCams' at RSPB Sumburgh Head ([www.shetland.org/puffincam/index.php](http://www.shetland.org/puffincam/index.php)).  
**GANNET COLONIES** on the island of Noss off the east coast of Bressay (accessible by boat from Lerwick) and at Hermaness on the island of Unst are spectacular.

**GREY AND COMMON SEALS** breed on Mousa and can be seen most of the year.  
**OTTERS** are widespread along the Shetland coast.



## WHERE TO GO

- 1 MOUSA, SHETLAND**
- 2 FAIR ISLE, SHETLAND** The Bird Observatory is a good petrel-watching base. 01595 760258; [www.fairislebirdobs.co.uk](http://www.fairislebirdobs.co.uk)
- 3 SKOKHOLM ISLAND, WALES** Skokholm has a small storm petrel colony and visitor accommodation. 01656 724100; [www.welshwildlife.org](http://www.welshwildlife.org)
- 4 BLASKET ISLANDS, CO KERRY** No accommodation here, but you can camp. Otherwise, day trips only. 00 353 66915 1344; [www.blasketisland.com](http://www.blasketisland.com)



I could open the metal gate to the tower and climb its stair, but I choose to stay outside, lying on the grass with my head against the stonework, looking upwards. For I can see and hear that the action is already underway.

Overhead, several small, bat-like shapes are in fast motion, chasing around the curving outer wall: storm petrels, the smallest seabirds in the world, at Britain's largest colony. The most recent estimate suggests that there could be nearly 12,000 nesting sites on the island, including in stone walls and natural crevices under boulders. But many of the 'stormies' live within the walls of the broch itself.

“Overhead, several small, bat-like shapes are in fast motion.”

I can hear them making soft, purring calls there, like little clockwork toys, punctuated by the occasional louder sound – “like a fairy being sick”, as the late, great Shetland naturalist Bobby Tulloch used to say. The purring will be from the males, the chattering a territorial signal by both sexes. That's part of the science, as is the discovery that some of the stormies at Mousa may live to nearly 40 years of age. Such findings have their own allure. But for the time being, my senses are filled with the shapes and sounds of these tiny ocean wanderers, dancing in the lingering blush of the *simmer dim*.



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# RICHARD MABEY

## A BRUSH WITH NATURE

Do we share an aesthetic sense with other animals, finding beauty in the same things?

**D**avid Rothenberg is the kind of maverick we could do with more of. He's a professor of philosophy and music with a night job as an eminent jazz clarinetist, and has written widely about technology and nature, and the philosophy of wildness. But he is best known for his jam sessions with birds at the Bronx Zoo – and for a series of books that outraged straitlaced biologists by suggesting animal song doesn't just resemble music, but *is* music.

Rothenberg's latest book, *Survival of the Beautiful: Art, Science and Evolution*, takes this argument further by proposing that most animals have an aesthetic sense: a notion of 'beauty'. This isn't as anti-Darwinian as it may at first seem. Darwin was bewildered by seemingly useless extravagances in nature – in bee orchids, bowerbirds, butterflies and kingfishers, for instance. Why so much pointless and dangerously flamboyant conspicuousness?

"The sight of a feather in a peacock's tail," Darwin wrote, "whenever I gaze at it, makes me sick!" He incorporated such frippery into his grand theory in *The Descent of Man* (1871), in the form of the idea of sexual selection. These impractical ornamentations were there to attract a mate and produce a new generation.

Rothenberg says this is tantamount to female organisms making aesthetic choices – female bowerbirds are, in essence, art critics. They dictate "the attributes of each species' defining style", regardless of how well they 'fit' their environments. But if this is so, what are wild species' own criteria of desirable 'beauty'? Why this pattern or that song, or one particular courtship dance routine? And why do we seem, mysteriously, so often to share other species' ideas of what is beautiful?

These conundrums have teased



“Female bowerbirds are, in essence, art critics. But what are their criteria of desirable ‘beauty’?”

scientists for at least a century. D'Arcy Wentworth Thompson proposed in his seminal *On Growth and Form* (1917) that evolution was governed as much by mathematical and physical laws as by natural selection, and that there were certain forms (such as spirals and honeycombs) that recurred in living things. These might be hard-wired into our brains as signs of the "proper way of things".

Nearly a century later, in *The Botany of Desire* (2001), the always entertaining and provocative writer Michael Pollan meditated on the common factors that may link insects' ideas of the attractiveness of flowers with our own. He wondered if symmetry, colour and contrast might not appeal to us both.

There is evidence that symmetrical features are a universal index of human beauty, and might drive sexual selection in our own species were it

not so overridden by cultural factors. We're also drawn – in friends and flowers alike – to diversity, intricacy and scale; to muddled Victorian roses and snub noses as well as to radially symmetrical daisies, to epic Antarctic snowscapes and the exquisite tiny patterns of oceanic diatoms.

When I try to think of one kind of image, one meaning of beauty that transcends cultural difference, I always return to the 35,000-year-old cave paintings of southern Europe. There are no formal rules of order or symmetry in these mesmerising horses, bison and aurochs, just an overwhelming sense of the *livingness* of these animals. Keats' words may have become a cliché, but perhaps "Beauty is truth, truth beauty". 🐾

**RICHARD MABEY** is one of Britain's foremost nature writers. He has written for *BBC Wildlife* since 1984, and appears regularly on BBC radio.



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# BILL ODDIE WILD AT HEART

In the good old days, you had to be much more inventive when filming wildlife...

Picture a small, suburban lawn. In the middle stands the trunk of a once-grand tree that has had all of its branches removed on the grounds that it is beyond saving. Its remains are riddled with cracks, crevices and holes. One hole, only a couple of metres above the ground, is particularly conspicuous. If it were higher up, in a bigger tree, it would belong to a woodpecker. But not this one, surely?

At which point, we hear the impatient 'tchek tchek' of an adult great spotted heralding his return to the hole, greeted by the frantic squeaking of the fledglings inside. What a set-up – a filming opportunity if ever there was one. Just a tiny problem – how do you get pictures from inside the tree?

First, find a man with a steady hand and an electric saw. Slice a sliver of wood off the back of the trunk, thus exposing the nest chamber and the fledglings. Replace the sliver with a pane of clear glass and erect a canvas hide at the back of the tree for the cameraman to work in.

Finally, retire to the kitchen and enjoy a cup of tea with Enid, the lady of the house, while waiting for 'Woody' and 'Winnie' to return.

You might have thought that all this activity would have unsettled the birds, but nothing was going to stop them from tending three chicks that were so young they were neither 'great' nor 'spotted' – nor, indeed, even slightly feathered.

As the days passed, they grew bigger and their plumage changed from baby grey to adult black and white. The only colour in the scene was the yellowish glow of the cameraman's lamp through the glass, towards which the chicks duly directed their rumps. Birds that nest in the dark defecate towards the nearest light, which is usually

the entrance. But in this case the cameraman had to do a lot of wiping. Nevertheless, he got some fabulous, arguably historic, footage.

If you don't remember, Woody and Winnie Woodpecker featured on a series called *Bird in the Nest*, which was broadcast live in 1994 and 1995. The presenters were Peter Holden (from the RSPB) and myself, and among the cameramen were Charlie Hamilton James and Simon King.

disconcertingly ingenious means were necessary. A nestbox containing a great tit family, for example, was removed from a tree, transported across the garden and relocated to the side of a shed that had been erected for the purpose.

Simon King managed to get some extraordinary footage of a kingfisher brood by digging into their bank-side nest. However, as related in a previous issue of *BBC Wildlife* ('Flights, camera,

“A nestbox containing a great tit family was moved across the garden to the side of a shed.”

Modern-day equivalents of *Bird in the Nest* use minuscule cameras that can be inserted into holes and burrows, and are bound by strict rules of non-interference. Back in the mid-1990s, however, filming nesting birds was achieved by whatever

action', May), through no fault of the film crew, the chicks sadly died.

Misfortune also befell Woody. His regular circuit involved crossing a busy road nearby, and his undulating woodpecker flight meant that he was in danger of becoming roadkill.

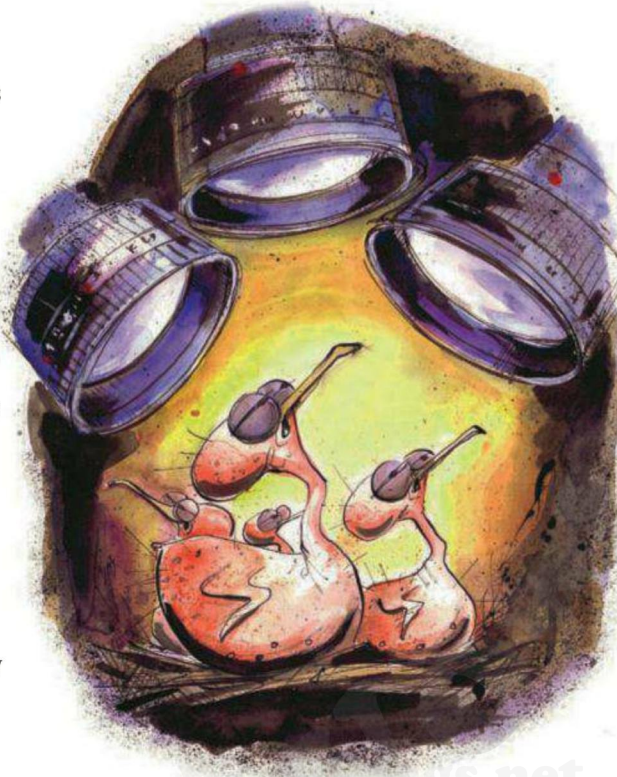
One day, the inevitable happened. A lorry driver came to see us and confessed, "I've just run over your woodpecker." We tried to console him by saying that it might not be Woody. But the bird was never seen again.

Peter and I wondered on camera whether we should provide extra food for Winnie and her brood. These days the question would have been more literal: "Shall we save them by putting out mealworms? Or let nature take its course? *You decide!*"

A bowl was duly placed below the nesthole, the family survived and the viewers rejoiced, just as they had wept for the kingfishers.

*Bird in the Nest* was dubbed "an avian soap opera" and accolades were bestowed on the BBC by the national press. But I can't help thinking: it's a good job they didn't find out how some of it was done.

Former Goodie **BILL ODDIE, OBE** has presented natural-history programmes (both serious and silly) for the BBC for well over 10 years.

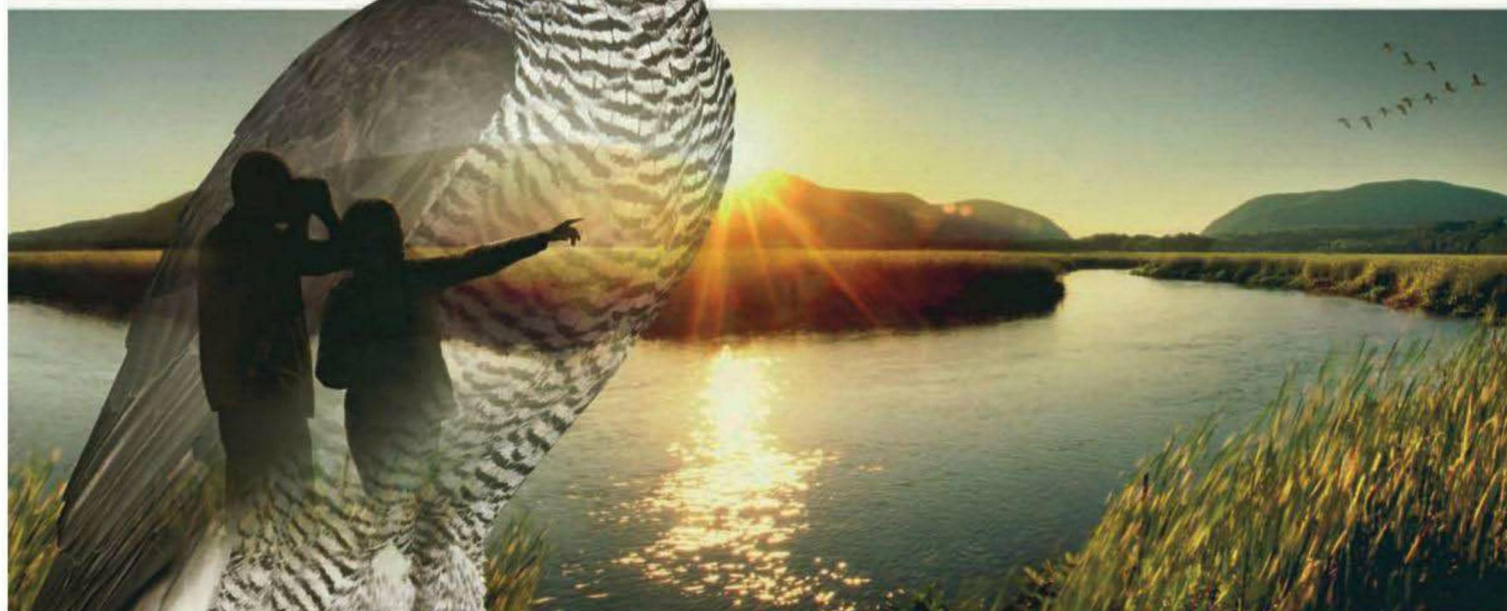




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# PORTFOLIO

## CHILEAN PATAGONIA *by Stefano Unterthiner*



I love working in truly wild parts of the world – but they are increasingly hard to find. Patagonia, though, is one of those precious wildernesses, and since I was a boy I have dreamed of photographing pumas in the beautiful light of Torres del Paine National Park. But photography in this harsh environment provides a unique challenge. I quickly realised that even weeks of exploration would yield only a flavour of the stark landscapes and, if lucky, a few photographs of my big-cat quarry as well as the antics of its main prey – the guanaco.

### STEFANO UNTERTHINER



Stefano spent his early years photographing the mountains

near his home in north-west Italy. Trained as a zoologist, he is now an award-winning wildlife photographer. [www.stefanunterthiner.com](http://www.stefanunterthiner.com)

**ABOVE** Guanacos are surprisingly speedy runners, capable of reaching over 50kph in short bursts.



### SCENE AND HERD

I watched this group of guanacos graze in Torres del Paine National Park as an early morning snow flurry dusted the ground. The post-dawn hours are among the most dangerous for the herbivores; pumas are on the hunt, and guanacos must be constantly alert, taking up positions on high ground to scan their surroundings for threats. I learned to listen out for the guanacos' loud and distinctive alarm calls as they helped me to locate pumas. This group – comprising one dominant male, his harem of females and the young of the year – was part of a larger aggregation of perhaps 60 animals, gathering ahead of the annual migration down to lower elevations where food is more easily accessible during the winter months.











## LAND OF FUR AND EYES

The guanacos in Torres del Paine are quite approachable – I was under 5m away from this individual when I took the photo. As this image illustrates, outside spring, when young are born and males battle to defend their territories and harem, guanacos don't do a great deal other than feed and rest. This portrait also showcases some of the species' adaptations to this challenging environment. Though not as luxuriant as that of its close relative, the alpaca, the guanaco's reddish, downy pelage provides protection from the icy 100kph winds that howl through this barren terrain, while its long neck and big eyes help it to detect stalking pumas.





### CAT'S EYES ▲

I was fortunate to spend two or three daylight hours in the company of this puma. These cats' tawny coats blend perfectly into the rocky, dusty landscape, making them extremely difficult to spot out in the open; in addition, they usually hunt at dawn and dusk. But this young adult, having spent the night feeding on a guanaco it had killed near the road, was relaxed and not too shy. Following it into a patch of woodland, I was able to quietly watch it from only 10m away – one of the most incredible wildlife encounters I've experienced.

### SOAR POINT ►

You often hear the Andean condor before you see it: the sound of the wind whistling through its feathers is extraordinary, and with a wingspan of over 3m – making it one of the world's largest flying birds – it's like a small plane flying overhead. Condors are quite curious – sometimes swooping down very close to me – and gather in circling flocks above guanaco carcasses, giving me another clue that might betray the presence of a feeding puma.



### BIG BIRD ►

This Darwin's rhea, the smaller of two species of this flightless bird, was one of several individuals I watched one morning – unusual, because they're quite difficult to spot, being shy and very fast, reaching up to 60kph. When I approached this bird it launched into a display of funny hopping jumps to let me know it had seen me, before dashing off like a huge, crazy chicken.







#### GLAD TO BE GREY

This South American grey fox was one of a couple of friendly individuals I encountered; this one in particular was very curious and took to approaching whenever I stopped for a lunchtime sandwich, hoping to scavenge scraps.

I was surprised at how small it was – perhaps 50cm long. Like other fox species, this animal is opportunistic, hunting small mammals, birds and insects as well as feasting on the remains of carcasses of larger prey such as guanacos – once pumas and condors have eaten their fill.





### BREAKFAST AL FRESCO ▲

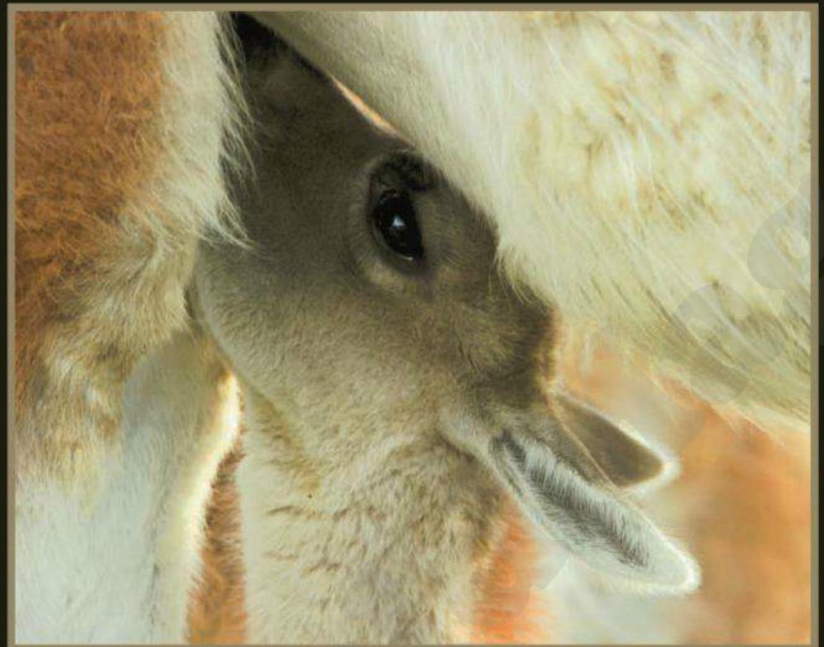
Though guanacos aren't too shy, it was tricky to get close enough to compose wide-angle shots like this, especially since nursing mothers are particularly skittish. So I was delighted to be able to photograph this pair as the dawn's glow painted the mountains a gorgeous pink.

Guanacos gestate for almost a year, giving birth to a single offspring, called a *chulengo*, in late spring, in a synchronised event: all young in each group are born at the same time. Females mate again very quickly – typically only a week or two later.

### NURSING TIMES ►

By good fortune, this mother and her offspring – perhaps four or five months old – approached my car, and the young demanded a feed just a few steps away, almost posing for the camera.

*Chulengos* are precocious, able to run within hours of birth. They are weaned at six to eight months and stay with their mothers for a year; most young guanacos – of both sexes – will be chased from the family group by the dominant male after the arrival of the next batch of offspring.











## KING OF THE HILL

After a painfully early start, I was rewarded by the sight of this solitary male standing sentinel on the brow of a hill, scanning the landscape for threats, just at the moment the sunrise set the craggy massif ablaze behind him. This is the time, between darkness and daylight, when guanacos are in most danger from pumas and are particularly alert, vocalising with loud alarm calls if cats appear.

After being ejected from their natal herd, yearling males usually band together with other young males for up to three years, after which they may become solitary – like this individual – or, if they are able to command a territory with ample food resources, recruit a harem of perhaps seven females. Young females may also form same-sex groups before joining a territorial male, mating for the first time at about two years old.





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## ON A ROLL ▼

Dust-bathing is a habitual activity among guanacos, and dust bowls, formed where vegetation has been worn away by the camelids' frequent back-rubbing, are common features in the landscape; guanacos indulge in this pastime for coat maintenance, back-scratching, possibly parasite control and – it seemed to me – just for the fun of it. A veritable conveyor belt of animals queued up for their turn to roll and squirm in the dirt before making way for the next itchy individual.



## LOOK BEFORE YOU LEAP ▲

I was watching this young guanaco take its turn in the communal dust-bath from a little way down the hillside; when it spotted me, it jumped up athletically in a leap made all the more dramatic – and comical – by the backdrop of blue sky created by my low viewpoint.

## OVER THE WIRE ▲

Stretches of wire fence, erected along some borders to stop livestock wandering into Torres del Paine National Park, represent a serious problem for guanacos. Not only do the animals, particularly young ones, often sustain injuries when tangled in the 1.3m-high fences after unsuccessful leaps, but fragmentation and isolation also pose a significant threat.





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### DAWN PATROL

Guanacos are alert to dawn attacks, but there are threats against which they have no defence. Though at first sight the national park appears to be a pristine wilderness, it has been heavily modified by humans; in pre-Hispanic times much of it was covered by forest, and today its remaining woodland and other habitats are at risk from fire. In 2005 almost 14,000ha were devastated in a blaze caused by a Czech backpacker, while last year another conflagration ravaged over 17,000ha. My hope is that effective management – and, ideally, expansion – of the park will safeguard its wildlife and spectacular landscapes.



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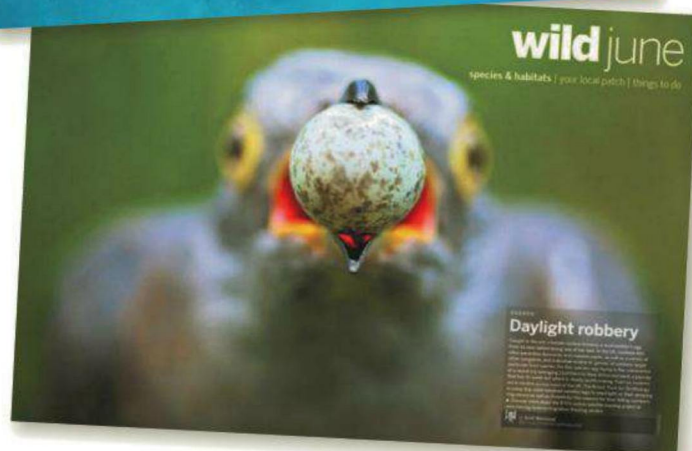
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# agenda

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edited by **James Fair**  
environment editor  
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## ► THE BIG PICTURE

### VIEW FROM THE TOP

Tasmanian campaigner Miranda Gibson gazes out from her treetop home 60m above the ground in a forest to the north-west of Hobart. The 30-year-old teacher has been living up in the canopy since early December as part of a campaign to save this tract of temperate rainforest from being logged. The area is home to some of Australia's flagship species, including Tasmanian devils and spotted-tailed quolls. Malaysian company Ta Ann, which has a 20-year agreement with Tasmania's state forestry body to log eucalyptus trees, says that all of the forests in which it works are independently certified as sustainably managed, a claim that Gibson rejects as greenwashing. **Simon Birch**



WorldMap.net





## PAGE 40

### CONSERVATION

#### LIVING WITH LIONS

Young Kenyan herder shines new light on how to stop lions from attacking livestock.



## PAGE 41

### NEW RESEARCH

#### BOWERBIRDS

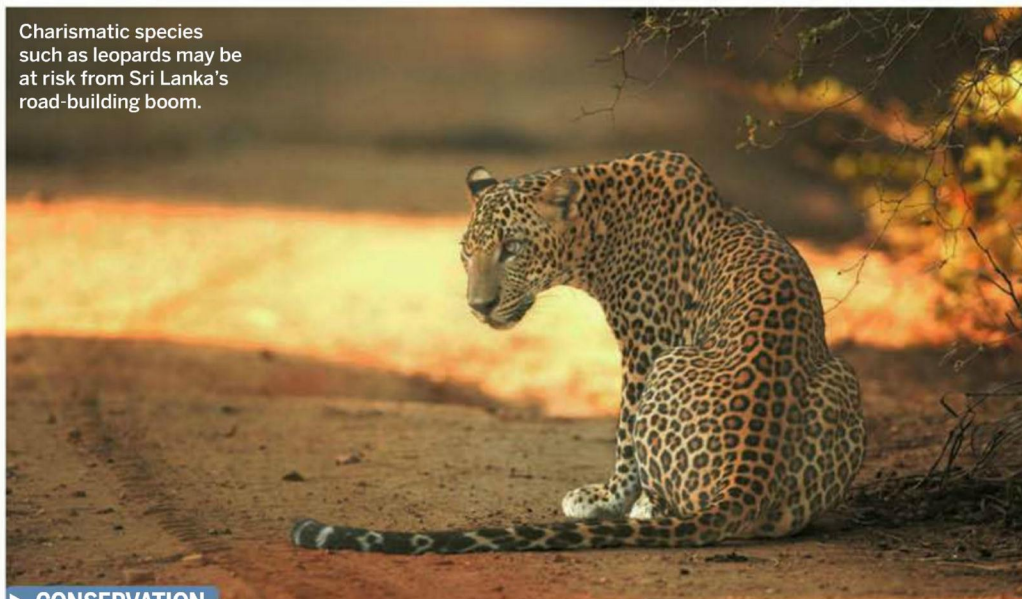
Male bowerbirds get fruity with their intended partners by growing their own.

**“Our great whales face more threats today than ever before.”**

**PATRICK RAMAGE, IFAW, p42**



Charismatic species such as leopards may be at risk from Sri Lanka's road-building boom.



## ► CONSERVATION

# The rocky road from peace

**Sri Lanka wants to expand its tourist infrastructure, but at what cost to its wildlife?**

Plans for a major road through Sri Lanka's largest national park have become a cause célèbre for conservationists trying to protect the island's wildlife.

The road through Wilpattu, on the north-west coast, was stopped in mid-construction two years ago following a legal challenge from four of Sri Lanka's biggest conservation groups.

A formal judgment from the Sri Lankan Supreme Court is expected this year.

Vimukthi Weeratunga, of Sri Lanka's Environmental Foundation, said: "If the road is built, it will damage many fragile habitats and lead to roadkills of species such as leopards."

HD Ratnayake, director of operations at the Department of Wildlife Conservation, said that the road was being built to

connect two communities to the north and south of Wilpattu (and at their request). "If the road did go ahead, we would put restrictions on, and charge for, its use, giving the money to the Wildlife Conservation Fund," he added.

But conservationists fear that this new road will allow for the development of Wilpattu's coastal strip for tourism. Much of the

north-west of Sri Lanka was out of bounds to tourists during the civil war because it was a stronghold for the Tamil Tigers, but with peace has come a building boom, financed by Chinese interests, who last year lent the government more than \$1 billion.

In recent years the island has become one of the world's top places to see wildlife such as leopards and Asian elephants. It is feared that these species' tourist potential could be their undoing.

An 'expressway' built to connect the city of Galle with the south of the country, for example, has caused a huge increase in roadkill.

And Weeratunga claimed that many projects in the pipeline wouldn't pass the environmental criteria of either the Asian Development Bank or the World Bank. "It's ironic that the Tamil Tigers didn't damage our wild areas but, after all our struggles for peace, our own government is," he said. **Nick Milton**

## ► BACKGROUND

■ With an area of 65,610km<sup>2</sup>, the island nation of Sri Lanka has the highest biodiversity rating in Asia.

■ Because it has a high number of endemic species, it has been named a 'Biodiversity Hotspot' by Conservation International.

■ There are 24 wildlife reserves, the most famous being Yala National Park and Sinharaja Forest Reserve.

■ 'Flagship' species include leopards, Asian elephants, sloth bears and blue whales.





At night, livestock in Kenya is kept in corrals, but it is still vulnerable to lion predation. However, a new lighting system could reduce the risk.

## ► CONSERVATION

# Lions in the light

**DIY lighting idea provides new solution to the age-old issue of lions preying on livestock.**

A 13-year-old Kenyan herder has built an innovative system of flashing LED lights that has protected his family's livestock from lions for the past two years.

Now Richard Turer's idea is to be tested more widely to see if it could have broader applications for reducing the growing problem of human-wildlife conflict, in both Africa and other parts of the world.

In Kenya alone, an estimated 100 of the country's 2,000 remaining lions are killed by local people each year, often in retaliation for livestock losses.

"Lions aren't easy to live with but, thanks to cheap poisons, they are easy to kill," said Dr James Deutsch, director of the Wildlife

Conservation Society's Africa Programme. "We work with people to help them defend their farms without killing lions. Nurturing this kind of creativity is important."

The principles of Turer's invention are sound, according to Alayne Cotterill of the Living With Lions group. "Lions nearly always seem to attack livestock after people have gone to bed, when

they can see that there's no activity," she told *BBC Wildlife*. "But they don't like bright lights at night – it affects their vision, and they associate it with people."

It's possible, however, that lions could become habituated to the lights, so they would cease to be an effective deterrent. Funds are being raised to investigate this.

Cotterill said that the idea could work in conjunction with other methods, such as the technique that Living With Lions has pioneered – using wire mesh to reinforce local 'bomas', or corrals, because their traditional construction material, thorn bushes, are becoming scarcer.

"We need a toolbox of ideas to use in different situations," Cotterill said. "This could be a very useful, cost-effective one to have." **Jennifer Hattam**

## ► KEEPING WILDLIFE OUT

- Planting chilli peppers, citrus fruit trees or patchouli around a farm can prevent elephants from eating valuable crops.
- Beehives hanging from a fence can also deter elephants, and selling the honey offsets the cost.
- Some British home-owners use lion dung to keep domestic cats out of their gardens.

# AGENDA interview

**JULIAN MATTHEWS on  
TIGER NATION**

## Can you describe Tiger Nation?

This new website is the online equivalent of *Big Cat Diary* for tigers. The idea is that people can follow the lives of individual tigers from the comfort of their living room.



## How does it work?

We've got photos of hundreds of tigers, and we're using software that can recognise individuals from their stripes – every animal is unique. Most of the tigers of India's Ranthambhore National Park have been identified, and we update the website on a daily basis.

## Who is taking the photos?

Guides, photographers, naturalists and tourists – we want anybody who takes photos of tigers in the wild to upload them. This is a 'citizen science' project, and we want as many people as possible to be involved.

## Is the government involved?

We have approached the Forest Department, which runs its national parks, but have yet to receive an official response.

## Won't this website give information to poachers?

Everything is on the net already – we're just making intelligent use of it. Arguably, it's worse when information is lacking, because tigers can then be more easily poached. **James Fair**

Julian Matthews is the founder of Travel Operators for Tigers and Tiger Nation: [www.tignation.org](http://www.tignation.org)

Sergio Pflaum/Corbis

## NEWS IN NUMBERS

# 280

The number of fin whales killed by Icelandic whalers in the past six years. Iceland has now abandoned plans to hunt this species in 2012.

# 2

The number of bottlenose dolphins that the Born Free Foundation has returned to the wild, after rescuing them from captivity in Turkey in 2010.



# 250

The number of Cross River gorillas, the subspecies of the western gorilla found only in Nigeria and Cameroon, known to survive today.



## DISCOVERY of the month

### How does the male bowerbird's garden grow?

If bowerbirds had fingers, they'd probably be green.

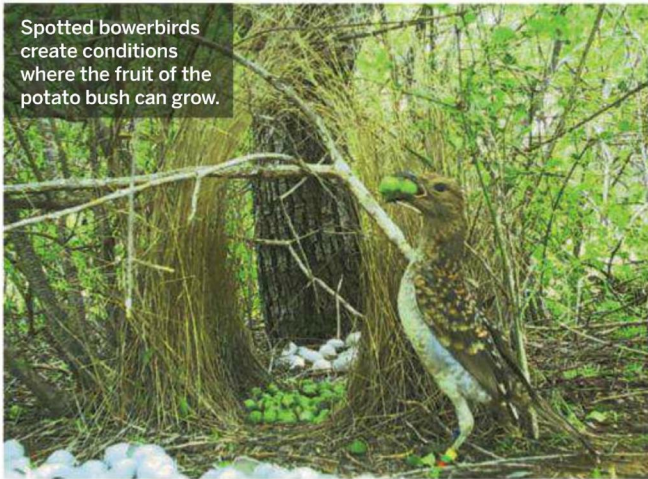
Male spotted bowerbirds don't say it with flowers. In the forests of Eastern Australia, fruit is the way to a female's heart.

But the bright green fruit of the potato bush are not for eating – they're eye-candy. The more fruit a male can pile up at his display ground, or bower, the more females he attracts. And new research led by Dr Joah Madden, of the University of Exeter, reveals that males actually cultivate a crop of the finest potato bushes, to the mutual benefit of both species.

By clearing leaf litter and vegetation from around their bowers, males provide fertile ground for the bushes that sprout from the rotting fruit. The resulting gardens provide males with new supplies to decorate their bowers, which they may occupy for 10 years.

By gathering the most attractive fruits, the males even seem to be 'improving' their crop by selective breeding. Plants growing around bowers produce brighter, greener fruit than those growing 'wild'.

Spotted bowerbirds create conditions where the fruit of the potato bush can grow.



“By gathering the most attractive fruits, the males are ‘improving’ their crop.”

Bowerbirds are not the only non-human agriculturalists out there. Some ants farm aphids for their honeydew, and others cultivate colonies of edible fungi, as do certain termites, beetles and even snails. They are, however, the only animals known to grow a crop for anything other than food.

Indeed, all but one of the 20-odd bowerbird species use fruit in their displays. Are they avian farmers, too?

“Almost certainly,” said Madden. “Any species that uses fruit as decoration creates the opportunity for such a symbiosis to develop.”

But this doesn't mean that the behaviour is comparable to human agriculture. There is little reason to think that bowerbird gardens are anything more than a happy accident. “We have no evidence that any of the males' [gardening] behaviour is intentional,” Madden told *BBC Wildlife*. **Stuart Blackman**

SOURCE *Current Biology*, vol 22, issue 8 [LINK](http://www.cell.com/current-biology/retrieve/pii/S0960982212002084) www.cell.com/current-biology/retrieve/pii/S0960982212002084

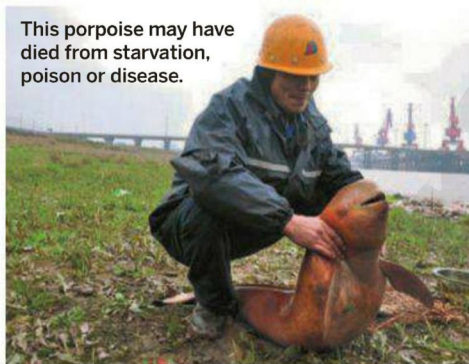
## ► ENDANGERED SPECIES

# Saving the finless porpoise

An increase in deaths of Yangtze finless porpoises – 32 this year, according to WWF – has prompted fresh concern about the future of this rare river cetacean. A survey carried out in 2006 suggested a population of only 1,800 individuals, with numbers falling at a rate of 6.4 per cent a year. Now the International Fund for China's Environment has launched an appeal to save the porpoise, warning that it could go the same way as the Yangtze's baiji – which was declared extinct in 2006 – unless action is taken. **James Fair**

► <http://yangtzeфинlessporpoise.weebly.com>

This porpoise may have died from starvation, poison or disease.



## NEWS IN BRIEF



### JAGUAR DIETS

Jaguars in Costa Rica are increasingly turning to green turtles as a source of food. Research published in the journal *Oryx* shows that, between 2005 and 2010, 676 marine turtles – all but four of them green turtles – were killed by jaguars. It's unclear why this is happening.



### THE LYNX EFFECT

A remote-camera image of a Canadian lynx using a specially built 'overpass' to cross the Trans-Canada Highway in Banff National Park has boosted the hopes of wildlife managers that these structures can reduce both animal – and human – casualties. Find out more about Banff's 'wildlife bridges' from [www.highwaywildling.org](http://www.highwaywildling.org)

### DOLPHINS' NET DECLINE

Cornwall Wildlife Trust says that there has been a surge in dolphin and porpoise deaths attributable to commercial fishing. Of 50 animals found on Cornish beaches since the start of 2012, 23 showed signs of having died in fishing gear. Research is ongoing to find an acoustic deterrent that will keep cetaceans out of nets.



# Have we failed the whale?

The great whales face more threats today than they did when commercial whaling ended 30 years ago, reports Kieran Mulvaney – so what are we doing about it?

Swimming through a slick of oil off the coast of Iceland, this humpback is not at any obvious risk. But marine pollution, climate change, noise, fishing, shipping and military activities all pose significant threats to the world's whales.

WorldMaps.net



Thirty years ago, the International Whaling Commission (IWC) voted to establish a moratorium on commercial whaling, theoretically bringing down the curtain on a tawdry tale, centuries in the making, of over-hunting in the pursuit of profit. It was a tale that came close to ending with the extinction of some of the Earth's largest-ever life forms. The passing of the whaling ban was accompanied by much rejoicing – and justifiably so.

“The decision to end whaling for commercial purposes was one of the greatest conservation achievements of our parents’ generation,” says Patrick Ramage, global whale programme director of the International Fund for Animal Welfare (IFAW). “Many people, and frankly many governments, assumed that the campaign was done and dusted.”

Except it wasn't. For one thing, commercial whaling continues – albeit at a level much reduced from its peak, and in most cases disguised as something else. Japan and Iceland, for example, assert that they are not killing whales for money, but ‘sampling’ them for research.

And in parts of Japan and South Korea, there is evidence that laws allowing the sale and consumption of whales that die after becoming entangled in fishing gear are leading to ‘directed entanglement’, in which the animals are driven into nets.

#### RISK RATING

It sounds horrific, but this is just one of a suite of problems facing whales in the 21st century. In fact, argues Ramage, “Our great whales face more threats today than ever before, and each threat requires more sophisticated solutions than meet the eye.”

Not all whale species, nor even all populations of a species, are at the same degree of risk from these threats. “Many whale populations are doing fine,” says Phil Clapham of the National Marine Mammal

## Right on: How technology can save the whale

- Endangered northern right whales are regularly killed after being hit by ships off the east coast of the USA.
- In response, researchers from Woods Hole Oceanographic Institution and Cornell University have developed a network of ‘listening buoys’ to detect right whales, through their calls, in the shipping lanes of the Stellwagen Bank National Marine Sanctuary north of Cape Cod.
- Information about the whales’ locations is automatically relayed

to the National Oceanic and Atmospheric Administration.

- To pass that on to ships’ crews, a team of software designers created an app for iPads and iPhones that provides real-time updates of where the whales are.
- Already established protocols tell ships if they need to change lanes or reduce speed.
- Chris Clark of Cornell University observes: “The idea that right whales are directly contributing to their conservation through their calls is pretty exciting.”



Laboratory at the US National Oceanic and Atmospheric Administration. “Humpbacks are a good example. Though a couple of populations haven’t recovered, most are doing well and are probably not suffering too many threats at the moment.”

The eastern sub-population of North Pacific right whale, in contrast, is estimated to number just 30 animals, while the North Atlantic right whale (a separate species) has a population of 450 or so. This is better than its relative, but still massively reduced from the pre-whaling era. It suffers the misfortune of existing alongside the seething mass of humanity in the north-east USA, in an area replete with fishing fleets and shipping traffic.

In the fish-rich Gulf of Maine, the biggest threat to whales is the vast number of vertical lines, attached at one end to buoys at the surface and at the other to gillnets, pots or traps below the waves and on the seabed. Nor is

it just right whales that suffer: studies of humpbacks in the Gulf suggest that mortality rates from fishing gear may be as high as 3 per cent.

Scientists writing last year in the journal *Diseases of Aquatic Organisms* said, “From a welfare perspective, lethal entanglements of baleen whales are...one of the worst forms of human-caused mortality in any wild animal.”

#### COLLISION COURSE

Entanglement is not the only problem facing whales in the Gulf of Maine, either. Right and humpback whales there are also among the whale populations most at risk of being hit by ships. Depending on the size and speed of the vessel, these encounters are frequently fatal to the whale.

It’s a problem in any area of high shipping traffic where whales drift slowly on the surface, and Clapham points out that, over the coming decades, the number of these areas will only increase.

“For some cetaceans, shipping in the Arctic is becoming a big issue,” he says. “With the loss of sea-ice, the Northwest Passage and the Northern Sea Route are going to be open more often.”

“Our great whales face more threats today than ever before.”



And as sea-ice melts, the region is destined to see not only more shipping but also, ironically, ever greater exploration for, and extraction of, oil and gas, the consumption of which has caused the climate change that melted the ice in the first place.

These activities increase the risk of oil spills, with potentially catastrophic consequences – just imagine the 2010 Deepwater Horizon disaster unfolding in the Arctic. But the risk of collisions with ships and pollution events may not even be the biggest threats to whales – noise could be a greater issue.

“Prior to the urbanisation of their world, North Atlantic right whales could talk to each other over 80km,” notes Chris Clark of the Bioacoustics Research Program at Cornell University. “Blue whales could communicate over 800km.”

Now, however, an increasing cacophony of human origin is drastically diminishing the ability of whales to talk to each other.

“The acoustic habitat of these animals has shrunk by between 70 and 90 per cent in their lifetime,” adds Clark. As a result, some whales can no longer conduct the communication critical to their social cohesion, including finding mates.

This noise pollution comes from sources such as shipping, but also seismic testing for oil and gas. This emits repeated blasts so loud, Clark says, that, with a hydrophone, he “can hear seismic activity 3,200km away in the middle of the Atlantic Ocean”.

Reducing whaling will prove a hollow victory if populations are unable to rebound because whales can’t find each other to breed. Addressing this is more complex than demanding an end to whaling, but at least the shipping, oil and fishing industries don’t want to kill whales.

## FINDING SOLUTIONS

So the search is on for solutions: designing ships that are quieter and requiring them to travel more slowly, and developing alternative fishing-gear types and eliminating others.

The noisiest ships, for example, are also the least efficient ones; changing their design and construction can benefit whales while saving the vessel operators fuel and money.

After a meeting between whale scientists and ship builders, the International Maritime Organization deemed reducing vessel noise a “high priority”, identified alterations to propeller design as the most effective way to do it, and is now developing recommendations for the world’s merchant fleet. Elsewhere, modern technology is being used to reduce ship collisions with right whales (see box, p43).

None of this may be as dramatic as piloting an inflatable boat in front of a harpoon, but, increasingly, it is the face of whale conservation in the 21st century. ☒

“The acoustic habitat of whales has shrunk by up to 90 per cent.”

## SAVING WHALES KEY DATES

**1851** Herman Melville asks in *Moby-Dick* whether “Leviathan can long endure so wide a chase, and so remorseless a havoc.”

**1929** Norwegian Whaling Act leads to the Geneva Convention for the Regulation of Whaling.

**1949** The International Whaling Commission (IWC) meets for the first time.

**1965** IWC bans the hunting of blue whales.

**1972** UN Conference on Human Environment votes for a 10-year moratorium on whaling.

**1975** First Greenpeace anti-whaling voyage takes place.

**1982** IWC votes for a commercial whaling moratorium.

**2003** IWC forms a Conservation Committee to address non-whaling threats such as climate change and over-fishing.

# THREATS TO CETACEANS

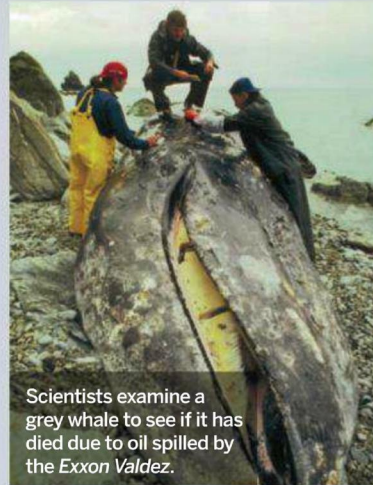
Besides commercial whaling, whales today must contend with six other major threats.

This young humpback has been wounded by a propeller.



## SHIP STRIKES

Between 2004 and 2008, there were 57 confirmed cases of ships striking large whales along the USA’s east coast, 30 of which resulted in death or serious injury. The real total was probably higher, because not all strikes are reported and whales that die far offshore are less likely to be seen.



Scientists examine a grey whale to see if it has died due to oil spilled by the Exxon Valdez.

## POLLUTION

Chemicals in cleaners, solvents, pesticides and many other products routinely find their way into the marine environment, as does oil from shipping and spills. Nutrients from fertilisers and animal waste can stimulate the growth of toxic algae. Incidents in 1987 and 2003 resulted in the deaths of 23 humpback whales from saxitoxin, which causes paralytic shellfish poisoning in humans.

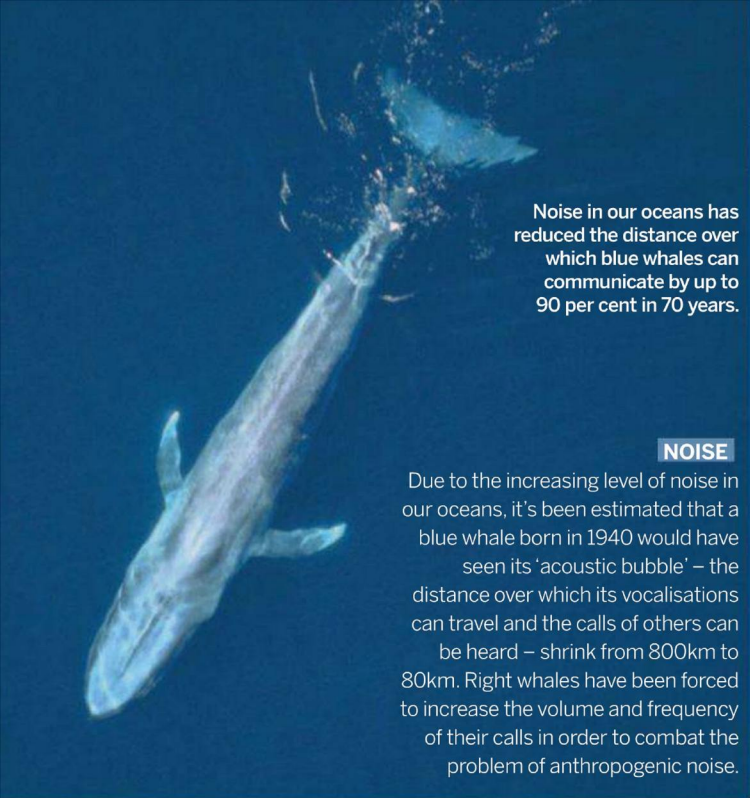
Bowhead whales may decline as Arctic ice recedes because of climate change.



## CLIMATE CHANGE

In the Arctic, sea-ice cover is declining by 11 per cent a decade, which may affect ice-associated species such as bowhead whales and belugas, though open-water species such as humpbacks may benefit. In the Antarctic, sea-ice declines could reduce krill numbers, with consequences for the entire Southern Ocean ecosystem.





Noise in our oceans has reduced the distance over which blue whales can communicate by up to 90 per cent in 70 years.

#### NOISE

Due to the increasing level of noise in our oceans, it's been estimated that a blue whale born in 1940 would have seen its 'acoustic bubble' – the distance over which its vocalisations can travel and the calls of others can be heard – shrink from 800km to 80km. Right whales have been forced to increase the volume and frequency of their calls in order to combat the problem of anthropogenic noise.

This minke whale was caught in creel pot lines off the Inner Hebrides in Scotland.



#### FISHERIES

Up to 300,000 cetaceans may be caught in fishing gear each year. Research suggests that 71 per cent of Alaskan humpback whales have been entangled at some point in their lives, with about 8 per cent acquiring new wounds every year. The expansion of the Antarctic krill fishery could deprive many baleen whales of their main source of food.



This Cuvier's beaked whale was part of a mass fatal stranding linked to the use of military sonar.

#### NAVAL SONAR

There have been 40 recorded mass strandings of Cuvier's beaked whales since 1960, and 28 of these events occurred at the same time and place as naval manoeuvres or the use of active sonar (which emits pulses of intense sound to search for submarines), or near naval bases.

# MARK CARWARDINE



On the wild thoughts that won't let him sleep. This month:

## Leave whale sharks alone

**T**alk about bad ideas. The so-called East African Whale Shark Trust (EAWST) plans to capture whale sharks, keep them in an enclosure off the south coast of Kenya and charge tourists US\$100 each to swim with them.

It's immoral and misguided on so many counts, I hardly know where to begin.

The sharks will be caught by ropes lassoed around their tails, held in the water with weighted buoys "until they fall into a state of tonic immobility" and then dragged to the enclosure. The plan is to have two sharks in place by November this year. Every six months, the captive sharks will be released and a new pair caught and kept in the enclosure.

The EAWST claims that the plan is to generate funds for whale shark conservation (presumably, money for the EAWST itself) in order to set up a potential breeding programme, to do research and to promote awareness.

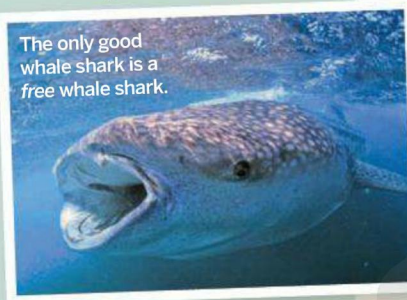
Since most of the whale sharks off the Kenyan coast are immature males, a captive breeding programme seems pretty fanciful (I think they must have missed some of their biology lessons).

And research on a couple of whale sharks in captivity isn't exactly a conservation priority – surely, tackling the

growing problem of whale-shark hunting off the coast of Kenya is considerably more important?

If tourists want to see whale sharks, they can be observed in more than two dozen locations around the world – as Tom Peschak demonstrated in his portfolio in the June issue. Searching for them in the wild takes a little more effort than in an artificial enclosure, but that's a good thing, because if you have

The only good whale shark is a free whale shark.



**“**The whale sharks will be caught by ropes lassoed around their tails and dragged to the enclosure.”

to work hard to see wildlife, you appreciate it more.

As for promoting awareness, any group that thinks it's a good idea to keep whale sharks in captivity should not be allowed to educate anyone about anything.


Mark Carwardine is a zoologist, photographer, writer, conservationist and BBC TV presenter.





www.kidsnet





These five-week-old cubs established their social hierarchy while they were still underground; now play reinforces their status. Larger males do better in fights over food and when being suckled.

Henryk Janowski/naturephotos.com.pl

#### THE EXPERT

##### STEVE HARRIS



is the UK's foremost expert on foxes, a professor of biological sciences at Bristol University and a regular in *BBC Wildlife Magazine*.

The lives of fox cubs are dominated by sexual politics and the weather. **STEVE HARRIS** reveals why big males fare best – and a wet summer is key to their success.

# THE GENDER AGENDA





By midsummer cubs are independent, and often spend the day lying up in patches of scrub or long grass. Play-fighting helps to prepare them for autumn's more serious combat.

Clockwise from top left: Jaroslav Vogel/Anz; Sven Zakok/Getty; Mark Hamblin

**J**uly is make-or-break month for fox cubs, particularly males. Put simply, the weather at this critical time determines the future course of their lives – whether they grow up big and strong, or become small adults who are less likely to get a territory and father fewer cubs.

For their first three months, fox cubs are fed by their parents, but in July they must start fending for themselves. A cool, wet month is ideal, because there are plenty of earthworms and insects such as beetles for them to eat. The males will grow into large adults – and

large males are successful males. By contrast, a hot, dry July spells disaster: the cubs struggle to find enough food, and the males are doomed to be smaller, less successful adults.

In Britain, most fox cubs are born around mid-March, with early litters arriving in mid-February and the latest in early April. Cubs spend the first four to five weeks in the den being suckled by their mother, usually emerging above ground for

the first time in late April or early May, when they start to take solid food. From then on, the litter of fox cubs grows rapidly and satisfying their hunger is extremely hard work.

There may be up to 10 adults – a mix of both sexes – in the cubs' social group, and they help with foraging since most of them are related to the cubs. They also feed the vixen, because she continues to suckle her cubs well into June, expending a lot of energy. So it is hardly surprising that, by early summer, all of the adults are exhausted: the vixen, in particular, is very thin. Since she is also starting to moult, she looks tatty as well.

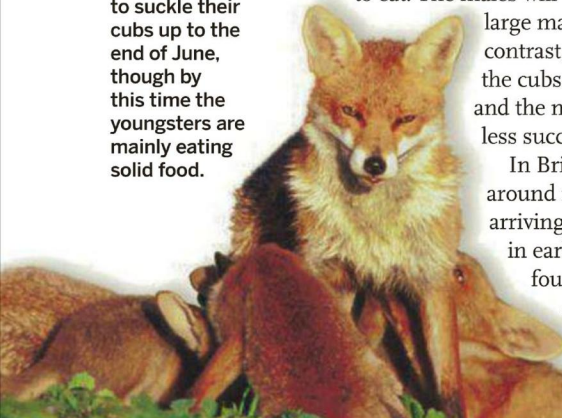
### THE TABLES TURN

Having done all she can to give her cubs a good start in life, the vixen desperately needs to recover. So at the beginning of July she and the other adults stop providing food to the cubs. Every year my wife Alex and I feed a litter in our garden in Bristol, and we never cease to be amazed by how abruptly things change at this point.

Up until the end of June, the cubs pursued adults for titbits, often cheekily grabbing tasty morsels from their mouths. But now the tables suddenly turn. The adults refuse to give up their meals, often aggressively driving away the cubs, and may even steal food from them.

Since the cubs are not taught to hunt by their parents, they have to learn for themselves. Acquiring the skill

Vixens continue to suckle their cubs up to the end of June, though by this time the youngsters are mainly eating solid food.





IN JULY CUBS START FENDING FOR  
THEMSELVES. A COOL, WET MONTH IS  
IDEAL, BECAUSE THERE ARE PLENTY OF  
EARTHWORMS AND INSECTS TO EAT.



This six-week-old cub is still  
living in its natal den, and is  
ready to bolt underground  
at the first sign of danger.  
Spring rain enables it to  
learn how to hunt insects  
and earthworms for itself.

WorldMag.net



Both the adult males and females bring prey to the den. While a rabbit is enough to feed an entire litter, it's likely that one or two of the cubs will monopolise the kill, leaving their smaller siblings to go hungry.



## SINCE THE CUBS ARE NOT TAUGHT TO HUNT, THEY HAVE TO LEARN FOR THEMSELVES. ACQUIRING THE SKILL IS FAR FROM EASY.

is far from easy. A study in the US found that even adult foxes managed to catch only 23 per cent of the mammals that they pursued, and just 2 per cent of the birds.

As it takes cubs a long time to master the art of hunting larger prey, in the meantime they eat lots of earthworms and other easy-to-catch food. However, in July the supply of worms is unpredictable, to say the least: if it is cool and wet, there are plenty available and the youngsters develop well. But if it's hot and dry, the worms stay deep underground, so the foxes struggle to find enough food and their rate of growth declines.

To make matters worse, in early summer the cubs are only about half adult size and thus very vulnerable. Understandably, they're cautious: they don't range over the whole of their parents' territory, but concentrate their activity around secure lie-up or rendezvous sites, often in clumps of gorse or dense brambles well away from the edges of the territory. This reduces the risks of aggressive





Clockwise from top left: Terry Whittaker/2020VISIONNaturepl.com; Terry Whittaker/FLPA



Cubs groom their parents throughout the summer. If they receive little social grooming in return they will be more likely to disperse in the autumn.



From late summer, cubs make short trips outside their territory to explore the surrounding area before dispersing.

## WHO STAYS AND WHO GOES?

In autumn, most male and some female cubs leave their natal territories – but who stays and who goes? The key factor at work is the danger of inbreeding should related foxes join the same social group. This is best avoided by male cubs with dominant mothers dispersing more often than those born to lower-ranking vixens. Dispersing females, meanwhile, are mostly those with subordinate mothers.

The reason for this is that male cubs with dominant mothers tend to be bigger and stronger, so are most likely to find a new territory. Male cubs with low-status mothers are smaller and thus have little chance of breeding even if they stay, so pose little risk of inbreeding.

Female cubs of dominant vixens stay behind, since they may inherit the territory from their mother. But female cubs of subordinate vixens have little chance of breeding in their natal group – so their best option is to try elsewhere.

encounters with neighbouring groups of foxes, but it further limits their opportunities for foraging.

So why is it important for male, but not female, fox cubs to be big? After all, as adults, males are not much bigger than females: the average weight in Britain is 6.8kg for a fully grown dog fox and 5.8kg for a vixen. So the average male is only 17 per cent heavier than a female.

### BIG IS BEST (IF YOU'RE MALE)

This size difference is not obvious to the untrained eye, and yet it is critical: larger males are more likely to win and hold onto a territory. They also tend to emerge victorious in boundary disputes with their smaller male neighbours. But the real benefits come during the mating season.

I often say that the sex life of foxes is best (and most politely) described as 'interesting', with a single litter of cubs having up to four different fathers. The normal pattern is for a male to try to guard a vixen until she has

mated with him, but there is no point in continuing to watch over her once she's pregnant. So the dog fox is then free to go gallivanting for the next couple of weeks, looking for additional mating opportunities in neighbouring territories before the season finally ends.

Heavier dog foxes are bolder and travel further, visiting more territories to seek out receptive vixens. This pays off: these males father more cubs each year because smaller males are less able to drive off their bigger rivals. Smaller individuals tend to sire cubs only within their own territories. But the size of the vixen appears to be largely unimportant: bigger males do not usually share their territories with bigger vixens, and bigger vixens do not have a higher probability of breeding or bear larger litters.

Because size is so important for males, but not females, you might expect vixens to invest more in their male offspring. This is exactly what happens. Most litters of cubs include both males and females. But over 30 years



# GROWING UP HOW FOX CUBS DEVELOP

## NEWBORN

**Weight** Male: 120g; female: 110g.

This may vary slightly, depending on the number of cubs in the litter.

**Appearance** Deaf and blind, with a stubby face, small, floppy ears and short, chocolate-brown fur. May have a white-tipped tail. Eyes (pale blue) and ears open at about two weeks.

**Behaviour** Stays close to mother; more mobile from three weeks old.

**Diet** Mother's milk.



## 4 WEEKS

**Weight** Male: 600g; female: 550g.

**Appearance** Face still rounded, with short snout and small ears; fluffy coat is in transition to reddish-orange of adult.

**Behaviour** Emerges above ground for first time, but stays near earth entrance.

**Diet** Milk, plus a steadily increasing proportion of solid food.



## 8 WEEKS

**Weight** Male: 2kg; female: 1.75kg.

**Appearance** Looks like a small adult, but with undersized ears, a snub nose and a slightly fluffy coat.

**Behaviour** Much more active, fighting over meals; uses body-slams to try to push other siblings off food items.

**Diet** Mostly solid food, though still suckled occasionally.



## HOW DO WARM, DRY SUMMERS AFFECT FOXES?

Summer weather can have a big impact on the behaviour and fortunes of many of our young mammals, and fox cubs are no exception. Some of the repercussions are obvious; others less so.

Fox cubs are fairly adaptable, so if it is a warm and dry summer, they can still generally track down something to eat. (Badger cubs, by contrast, fare much worse, since they are heavily dependent on earthworms.) But, while young foxes may find enough food to survive, they often struggle to obtain sufficient protein to keep growing.

Many climate-change scientists are predicting that warm summers are set to become more common in the UK – perhaps one year in every three will be hotter than average. Certainly, 2011 was dry throughout the year and, despite the Met Office declaring April 2012 the wettest on record, groundwater levels remain low.

If the future does hold more warm and dry summers, Britain's foxes are likely to become a little smaller, and this will have a range of implications for their social behaviour.





### 13 WEEKS

**Weight** Male: 3.5kg; female: 3kg.

**Appearance** Much more like adult, with amber eyes, large ears and long snout. But looks 'gangly' because of its disproportionately long legs, slim body and thin tail.

**Behaviour** Starts to practise hunting skills.

**Diet** Forages for earthworms and insects; no longer given food by adults.



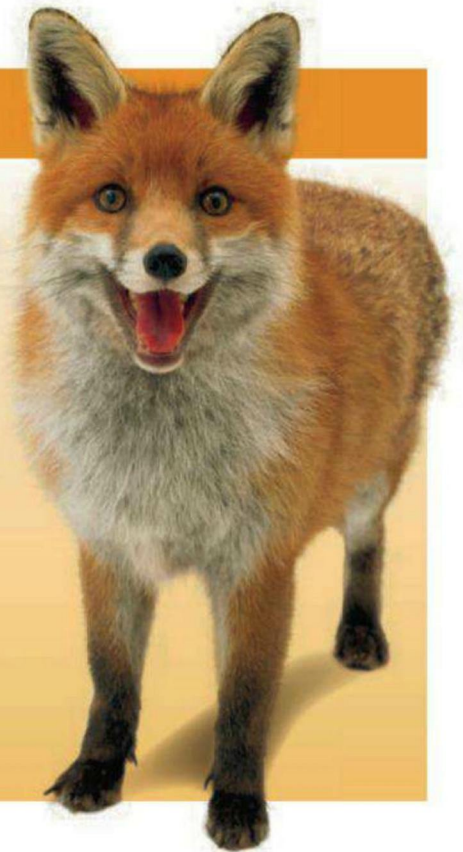
### 26 WEEKS

**Weight** Male: 6kg; female: 5kg.

**Appearance** Classed as 'sub-adult' and nearly adult size. The fresh, lustrous winter coat is said to be at its prime; in the past, foxes were hunted for their pelts at this age.

**Behaviour** Continues to hone its hunting and social skills.

**Diet** Same as adult: scavenged items (in urban areas), birds, small mammals, invertebrates and fruit.



ago, the zoologist Gwyn Lloyd, while studying foxes in Wales, found that male cubs are born on average about 11 per cent bigger than their sisters. This suggested that vixens preferentially feed their male offspring even before they are born, though it was unclear how they manage to do so (in fact, we still don't understand this process).

Lloyd also found that, in the later stages of pregnancy, there was a small shift in the sex ratio of developing fetuses in favour of males, suggesting that vixens might also have been aborting some female cubs in order to invest more resources in the males. At birth, the sex ratio of most fox populations is slightly biased towards males.

My recent study with Helen Whiteside, a PhD student, has shown that vixens are also investing in their male offspring in a variety of other ways. First, the date the litter is born is influenced by the proportion of male cubs it contains. Rather than being born earlier so that they have a longer growing period, litters with more male than female cubs are actually delivered *later*.

This is because there is a critical period of rapid growth early in a cub's life: vixens have male-biased litters later in the spring so that these cubs are weaned when their main prey – rabbits and small mammals – have started breeding. Doing so ensures a plentiful supply of food for the cubs during their most crucial growth phase.

### SIBLING SQUABBLES

There are other, even subtler, mechanisms at work as well. Bigger vixens have more male cubs because, being bigger themselves, they are better able to cope with the extra energetic demands of producing large males. Meanwhile, smaller mothers produce more female cubs because they are less demanding (both before and after they are born) and because size is not important for females once they reach adulthood.

Male cubs continue to grow faster than females while suckling, and also when they move onto the solid food provided by the adults. We don't know whether the

vixen is deliberately feeding her male cubs more, or if it is simply that being born a bit heavier gives them a competitive advantage over their smaller sisters.

A lactating vixen normally has eight teats, but those in the groin produce more milk, so the cubs shove each other out of the way to latch onto the rearmost teats. The bigger males may have an advantage in these struggles. And, when they start eating solids, the cubs fight over the prey brought back by the adults, with one cub often seizing the food and running off with it. That youngster defends its prize against its litter mates, even after it has eaten its fill.

## BIGGER VIXENS HAVE MORE MALE CUBS BECAUSE THEY COPE BETTER WITH THE EXTRA ENERGETIC DEMANDS OF PRODUCING THEM.

Again, being bigger is a huge asset in these squabbles, and it may help male cubs to continue to grow faster.

Whatever the mechanism, being born bigger means that male cubs get off to a good start and will grow faster than their sisters throughout their first three months. However, once they start to fend for themselves, they no longer have such an advantage. Now it is all down to the weather.

A wet summer enables the cubs to keep growing fast while learning to hunt. This is vital, since the cubs stop growing in autumn, when they reach adult size (in other words, they can't make up for any growth 'lost' over the summer). Male foxes born in years with dry summers are up to 12 per cent smaller as adults than those born in years with the wettest summers. So hot, dry summers lead to small, unsuccessful male foxes, and all the hard work by their parents has been to no avail.

Let's hope for a wet summer this year: it might spoil a few holidays, but will be great news for our foxes. 🦊



### ON OUR PODCAST

Steve Harris joins the *BBC Wildlife* editorial team to discuss why July is so important for red fox cubs.

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# BIG FIVE LITTLE FIVE

Ruthless predators, fierce horned wrestlers, armoured reptiles – as **Stephen Mills** explains, in Africa some of the smallest species pack the biggest punch.

## THE EXPERT

### STEPHEN MILLS



is a writer and natural-history film-maker who is also a wildlife tour guide in Africa. He is a regular contributor to *BBC Wildlife*.

**S**afari-goers in Africa, particularly first-timers, tend to be obsessed with size. Indeed, many choose their destination based solely on the chances of spotting the so-called Big Five – the quintet that colonial-era hunters considered most risky to stalk on foot: lion, black rhino, buffalo, leopard and elephant. To my mind, though, small can be even more beautiful. And I'm not alone. To prove the point that more diminutive species can be every bit as fascinating as their super-sized namesakes, African guides have mooted an alternative ticklist: the Little Five. Join a microsafari and keep your eyes peeled for miniature marvels...

## ELEPHANT SHREW

They're not shrews – not even closely related. But, surprisingly, molecular evidence suggests that the 17 species of this Lilliputian insectivore belong to a unique, ancient African family and may in fact share a common ancestry with elephants. However, the name was coined in recognition of their long snouts, and because they are relatively big – for shrews (the largest species can weigh 700g). Many naturalists now prefer to use a Bantu name, sengi.

That elongated, tubular proboscis is highly mobile, twitching as it sniffs the air for prey, predators and intruders: sengis are prodigious hunters of invertebrates, and fierce in defence of their feeding territories. They are thinly dispersed, but if you sit still among plant-strewn rocks or in grasslands you might spot one dashing between tussocks – with long, powerful hind legs, most species are capable of high-speed hopping. Common species to watch out for are the eastern rock sengi in South Africa, round-eared sengi in the Kalahari and cute little rufous sengi in East Africa.



At only 50g, the eastern rock sengi is one of the smallest species, but fiercely defends its patch from rivals, using well-defined paths to patrol its territory.





# LEOPARD TORTOISE

Unlike its feline counterpart, which is famously hard to spot on safari, a sighting of a leopard tortoise is a realistic goal on the savannahs of East and Southern Africa. Don't expect to see a baby, though – for its first five years a young tortoise's shell is quite soft, placing it high on the menus of many predators, so juveniles tend to stay well hidden under rocks and logs. Once the carapace has hardened up, however, this tank-like armour is impervious to almost every threat except bushfires, and the reptiles become much more relaxed about public appearances. I've watched them plodding along the very tip of the Cape of Good Hope, munching contentedly on proteas; you're likely to spot one crossing a track

or grazing on grasses and succulents on the verge.

As the name suggests, this handsome tortoise carries a high-domed shell often marked with beautiful, leopard-like black and yellow markings. Those that survive the dangerous early years can live to the ripe old age of 80, or even more, growing to prodigious proportions – specimens in more northerly regions of Africa can reach 60kg (comparable to a big female leopard) and 1m long, while in Southern Africa 18kg is a more usual size.



The leopard tortoise is the world's fourth-largest, reaching its biggest proportions in Ethiopia where 1m specimens have reportedly been spotted.

# RHINOCEROS BEETLE

There's no mistaking a rhino – whether mammal or arthropod. And the beetles – shiny black whoppers that appeal to the urchin in all of us – are a must-spot on any safari. Though they weigh a mere 3.5g (a piffling speck alongside a 1.3-tonne adult black rhino), they are undeniably impressive creatures. The biggest and most common species in Southern Africa is *Oryctes boas*, 4.5cm in length and sporting a huge horn curling back from its head, used for 'jousting' with other males for feeding sites and, probably, mates.

Rhinoceros beetles are nocturnal and attracted to light, so for the best chance of seeing one, leave a lamp on near your room or tent and listen out for the whirring thwack as a flying beetle cannons into the light and falls to the ground.

The beetle's larvae are soft

white grubs that feed on plant roots and can be an agricultural pest. But they are packed with vitamins A and C, calcium, magnesium and protein – so if you're on a really wild safari, you can dig them out of the soil and fry them up as the locals do, particularly in West Africa.

Some 300-plus species of rhinoceros beetles are found in locations all over the globe; the largest inhabit the tropics – the hercules beetle of Central and South America reaches 17cm and weighs a staggering 17.5g.



Despite its intimidating appearance, the rhinoceros beetle eats plant sap and fruit.



# ANT LION

Search stretches of sandy soil and you may find small, cone-shaped depressions – signs that antlions have been at work. These voracious little snappers, predators as ferocious as any maned feline, punctuate the landscape with pit-traps. Taking the time to watch an antlion construct and operate its trap will enrich any safari – the process is a minuscule marvel.

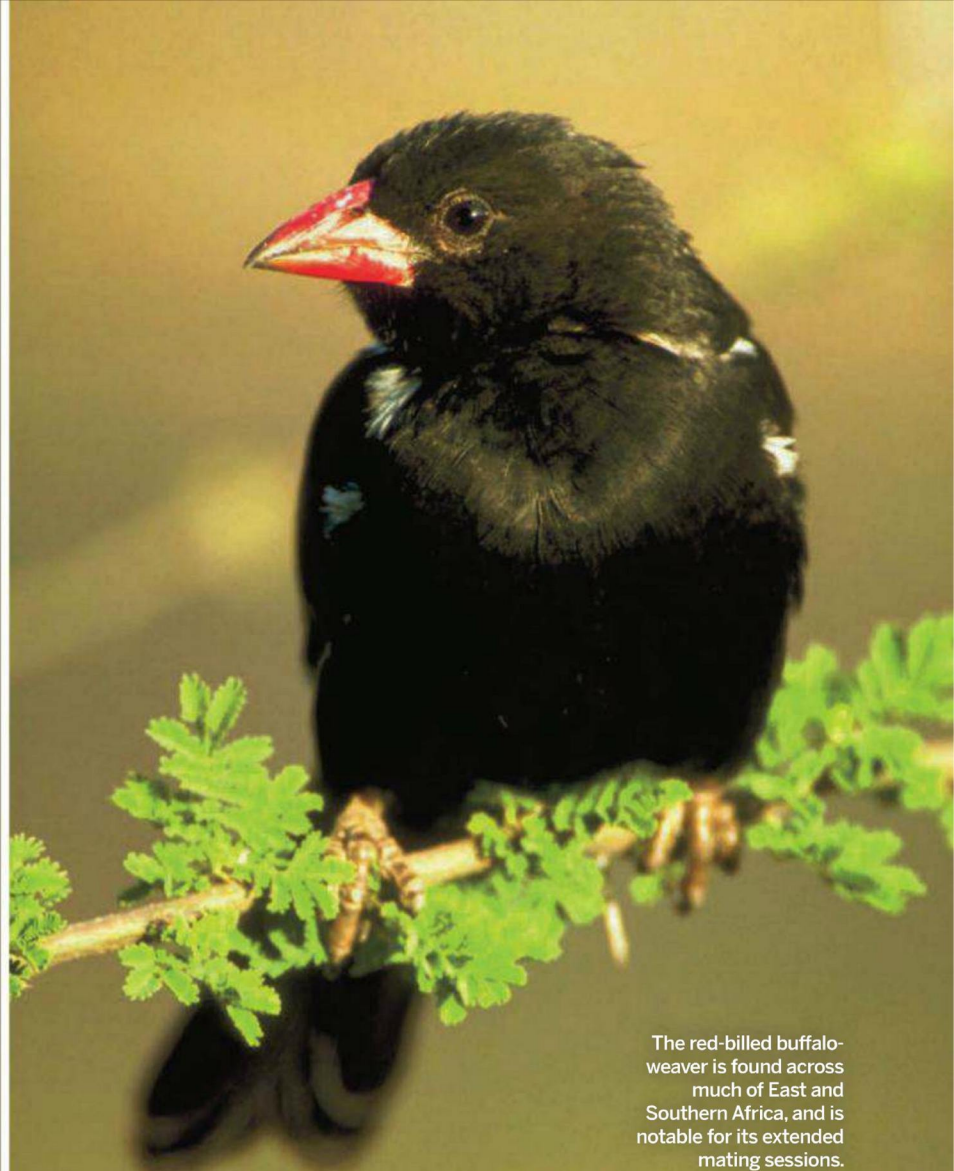
To dig its pit, the hunter first draws a circle in the sand, perhaps 6cm in diameter, moving backwards and using its abdomen as a spade. With one leg the antlion transfers the heaped sand to the back of its head, where with a flick of the body it throws it clear of the trap. Excavation continues till the pit is 4cm deep – enough to conceal its architect – and the slope perfectly pitched so that further disturbance will bring the grains round the rim down into the pit. The trap is set.

When an ant or a tiny spider steps onto the rim, grains of sand cascade from under its feet, sweeping the victim down to the antlion at the base of the trap. If the prey tries to escape, the hunter throws sand at it to knock it down, then clamps its jaws and sucks out the innards.

Yet this is a Jekyll-and-Hyde character: after two or three years as a monster it transforms into a graceful fairy. For the antlion is the larval stage of a type of lacewing, like a pale damselfly, a member of the global Myrmeleontidae family.



The antlion's vicious-looking mandibles not only grasp prey, but also inject it with toxins and digestive juices.



The red-billed buffalo-weaver is found across much of East and Southern Africa, and is notable for its extended mating sessions.

# BUFFALO WEAVER

Unlike the other members of the Little Five, buffalo-weavers are named neither for appearance nor behaviour. These finch-type birds were so labelled for their habit of following grazing buffalo and cattle, feeding on insects disturbed by the herbivores' hooves. In Southern Africa, look out for the red-billed buffalo-weaver, which breeds in colonies, weaving large balls of dry grass into many-chambered nests shared like avian apartment blocks.

The buffalo-weavers' main claim to fame is somewhat less obvious: they are believed to be unique in possessing

a phalloid organ – a fake 'penis' in front of the cloaca, the real sexual unit. The organ is stimulated during mating, encouraging the male to extend the act: sessions can last 20 minutes, much longer than the brief exchange of fluid in most birds. It seems that a long-lasting act increases a male's chances of his sperm being selected by the female above that of her many other mates. If you're keen to catch amorous weavers *in flagrante*, bear in mind that the scientists who studied this behaviour only witnessed eight real matings in three years of research.



## ON OUR WEBSITE

Enjoy photos of the Big Five, Little Five and the Big Six birds in our exclusive online gallery. [www.discoverwildlife.com](http://www.discoverwildlife.com)



# The turtle that time forgot

Unlike other sea turtles, the flatback has an odd, soft shell, seldom travels far and is highly promiscuous. **DOUG PERRINE** unravels the secrets of Australia's mysterious mariner.

Photos by **DOUG PERRINE**





An adult female flatback turtle rests on the seabed in the shallows off Australia's northern coast, the favoured haunt of this species. She has flipped sand over her carapace for camouflage.

One October morning in 1952, the British government tested a nuclear weapon in a lagoon in a remote archipelago, the Montebello Islands in the Indian Ocean, off the north-west coast of Australia. The devastating fireball that erupted from the water was topped by a dark crown containing the vaporised remains of HMS *Plym* (on which the nuclear device had been detonated), part of the seafloor and the shoreline of Trimouille Island, as well as hundreds and hundreds of sea turtles.


#### TURTLE MAYHEM

It was the peak of the turtles' mating season, so I can't help wondering if the unsuspecting reptiles might have experienced the most extreme instance of *coitus interruptus* in history. At any rate, the following year a visitor to the island described a terrible stench: for the entire length of the beach, dead turtles were "piled three or four deep, in a layer from six to ten feet wide".

Over half a century later, sea turtles have resumed feeding and nesting in their thousands on and around the islands ►







Unlike all other sea turtles, the flatback spends its entire life in the sunlit waters over the continental shelf. Here, a female rises to the surface to breathe.

## THE EXPERT

DOUG PERRINE



is one of the world's foremost marine wildlife photographers, and founded the SeaPics picture agency.

surrounding ground zero. Most of them are flatback and green turtles, together with smaller numbers of hawksbills.

Marine biologist Kellie Pendoley is an expert on flatback turtles (in fact, she loves the species so much that she has one tattooed on her posterior). "They're resilient animals – they've proved to be amazingly adaptable," she says, reminding me that the ancestors of these ancient reptiles appeared at about the same time as the dinosaurs. Since then, they have survived two mass extinctions, each of which destroyed half to three-quarters of all life on Earth.

It is clear that flatback turtles have been stubbornly surviving all manner of calamities – and that we humans have been stubbornly doing our best to ignore them.

## A TURTLE OF MYSTERY

James Spotila, a professor of environmental science who is a leading authority on sea turtles, refers to the flatback as a "turtle of mystery". It's an apt label: *Natator depressus*

has a much lower profile than its relatives, and reference books about sea turtles typically devote just a handful of poorly illustrated pages to the species.

The flatback has by far the most restricted range of all sea turtles, occurring only off the northern half of Australia and southernmost parts of New Guinea and Indonesia. We know so little about the species' population (the best recent estimate, from 2004, was 20,285 nesting females) that the IUCN has revised its threat level from Vulnerable to simply Data Deficient.

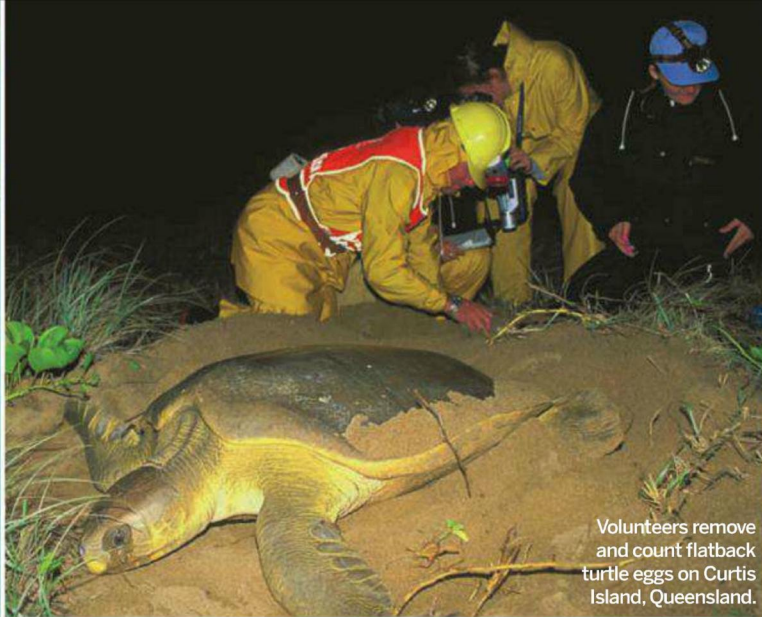
There have been so few studies of the flatback that most of what we 'know' about the species is inferred from our knowledge of other sea turtles. For instance, other species return to nest where they hatched, so it's assumed that flatbacks do the same. Yet no one has actually proved that female flatbacks imprint on their natal beaches.

Not until 1967 did biologists recognise that flatbacks are sufficiently distinct to warrant being described as a separate species. "In the past, we always just assumed that they were like green turtles," says Mick Guinea of AusTurtle, an NGO. "Now, the more we look at them, the more different we find they are." In 1988, these curious chelonians were finally placed in their own genus.

To anyone who has seen a flatback turtle (or even just a photo of one), it may seem odd that scientists did not distinguish the species from the green turtle any

THERE HAVE BEEN SO FEW STUDIES OF THE FLATBACK THAT MOST OF WHAT WE 'KNOW' ABOUT THE SPECIES IS INFERRED FROM OUR KNOWLEDGE OF OTHER SEA TURTLES.





Volunteers remove and count flatback turtle eggs on Curtis Island, Queensland.

Adult flatbacks share shallow lagoons, bays and reef flats with blue-spotted stingrays.



earlier, given the former's unique appearance. Its body is compressed, and the upturned edges to its carapace, or upper shell, recall a squashed Stetson hat. The carapace itself is soft and smooth, and bleeds easily if wounded – unlike other sea turtles, which have an armoured shell made up of hard, horny plates known as scutes.

How could these creatures have stayed under the marine biology radar for so long? Part of the reason is that, for most of the 20th century, northern Australia was a sparsely populated, wild and dangerous place. Scientists describing the turtles worked in laboratories a long way away, using poorly preserved specimens.

Even if they had wanted to study their subjects in the wild, they might have struggled. Flatbacks favour shallow areas with a soft, muddy seabed, where the water is often turbid due to suspended sediment and algae. Field observations and photography are thus very difficult.

To make matters worse, the turtle's murky habitat attracts seasonal aggregations of box jellyfish, which trail tentacles up to 3m long that each pack thousands of stinging cells – they can kill in minutes. It is also the haunt of the tiny but deadly Irukandji jellyfish (which has venom 100 times more potent than that of cobras), big saltwater crocodiles and healthy populations of tiger sharks.

All things considered, it's not surprising that, until the end of the 20th century, good photographs of live flatbacks were very difficult to find. The images on these pages are probably the first photos of wild individuals taken underwater with a professional camera.

### LOCAL KNOWLEDGE

Nevertheless, aboriginal hunters have long been aware of flatbacks: as so often happens, the locals were far more knowledgeable about the species than the visiting scientists. They were readily able to distinguish flatbacks from other turtles, as were the commercial turtlers who harvested Australian waters from the late 19th

## THE VANISHING ISLAND

Erosion of nesting beaches by rising sea levels and increased storm activity caused by global warming is often cited as a major threat to flatback and other sea turtles. Turu Cay represents the wider problem in microcosm.

► Turu Cay is a tiny sandbank in the Torres Strait, between Australia and New Guinea. When he landed in 1910, naturalist AS Meek described it as "one great nest for turtles".

► In 1987, scientists visiting the site found just 21 turtle nests. Worryingly, they also noted that about 75 per cent of the cay was awash during the spring high tides.

► During my own visit in 2007, more than 80 per cent of the cay was swamped during high tides. There was, sadly, no evidence of turtle nests – it is highly unlikely that any could have survived the saltwater inundation.

► I saw terns breeding on the cay, but many of their nests were flooded. In front of my eyes, hatchlings were washed out to sea and snapped up by sharks.



Not realising the danger they're in, newly hatched crested tern chicks are washed out to sea as a rising tide swamps much of Turu Cay, a 90cm-high sand bar used by nesting seabirds.



A blacktip reef shark seizes hatchling tern chick





After reaching the relative safety of the sea, baby flatbacks swim continually for 24 hours, but don't ride currents out to deeper water.

## THE IMAGES ON THESE PAGES ARE PROBABLY THE FIRST PHOTOS OF WILD FLATBACKS TAKEN UNDERWATER WITH A PROFESSIONAL CAMERA.

century until the 1970s. For them, species recognition was an economic necessity. Green turtles are (to this day, unfortunately) considered very tasty and the best eating of all seagoing reptiles, whereas flatbacks are thought to be barely edible.

Flatback flesh might contain noxious compounds accumulated from the species' prey, which is believed to consist largely of invertebrates with chemical defences against predation, such as sea cucumbers, soft corals, sea pens and sea jellies. Even this is conjecture, though. There are reports of flatbacks pursuing fish, squid and cuttlefish, but Pendoley admits that researchers do not

Having deposited her precious eggs, a nesting female hauls herself back to the sea.



have a lot of information to go on. "We really don't know what the turtles are targeting," she says.

Unsavory flesh has its advantages. While flatbacks suffer from many of the threats facing other sea turtles – including entanglement in fishing nets and gear, ingestion of marine debris, boat strikes, offshore mining and drilling, and nests being flooded or overheating due to climate change – their taste has at least saved them from commercial harvesting. Meanwhile, the aboriginal consumption of flatbacks is (eggs aside) very limited.

### THE LOST YEARS

But it is the juvenile stage of the flatback turtle's life-cycle that most sets it apart from its relatives. To appreciate how odd it is, we first need to look at how the six other sea-turtle species spend their early lives.

In those species, there is a developmental period known as the 'pelagic dispersal phase'. After hatching, the baby turtles scurry to the surf and swim out to sea in a burst of activity that lasts from one to several days.

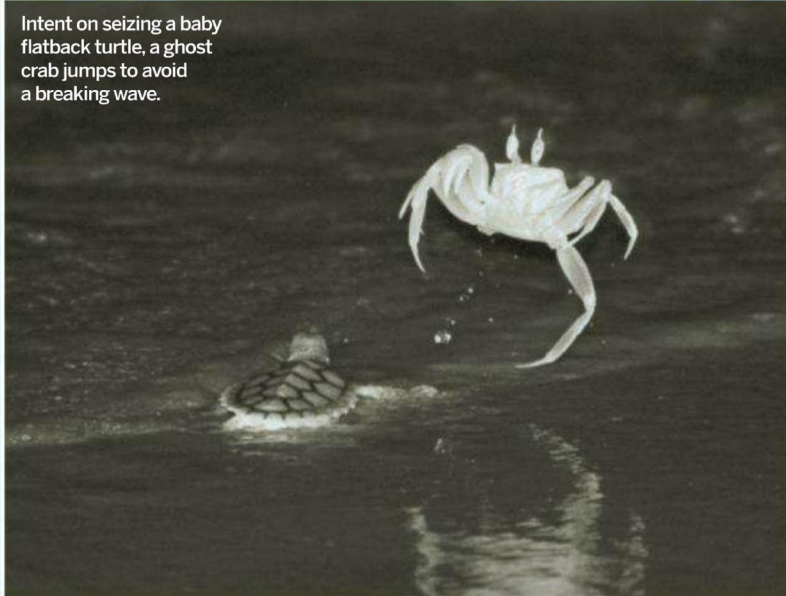
Upon reaching the open ocean, they hitch a lift on currents to complete migrations that rank among the greatest in the animal kingdom, only returning to inshore waters as juveniles.

This peripatetic period, often called the 'lost years', lasts up to nine years (or occasionally longer), finally





Baby flatbacks race to the waterline. They each weigh about 43g – much more than the hatchlings of most other sea-turtle species.



Intent on seizing a baby flatback turtle, a ghost crab jumps to avoid a breaking wave.

## FACT FILE

# FLATBACK TURTLE

*Natator depressus*



### ► WEIGHT

Adult female: 50–90kg;  
adult male: unknown.

### ► LENGTH

Adult female: carapace  
(upper shell) 58–100cm.

### ► ID TIPS

Smooth, soft carapace with  
upturned edges; scutes  
(plates) do not overlap.  
Paler than other sea turtles.

### ► DIET

Adult: thought to eat mainly  
jellyfish, soft corals, sea  
cucumbers and other soft-  
bodied invertebrates.

### ► LIFE-CYCLE

Female probably starts to  
breed at about 20 years old  
and nests up to four times  
per season, usually laying  
50–60 eggs each time. Eggs  
hatch after about 55 days.

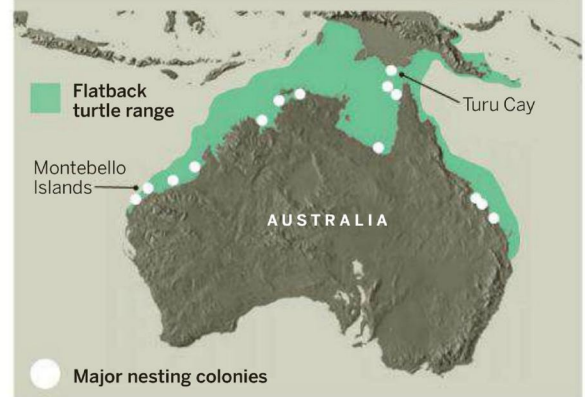
### ► HABITAT

Soft-bottomed, shallow,  
tropical waters.

### ► STATUS

IUCN: Data Deficient;  
classified as Vulnerable by  
the Australian government.

## WHERE IN THE WORLD



ending when the juvenile turtles re-enter habitats where they're easily observed. Some loggerheads have been found to circumnavigate the entire North Atlantic basin twice during their pelagic phase. It is this stage in the sea turtles' life-cycle that is largely responsible for their dispersal throughout the world's warm oceans.

Flatbacks are different. The babies begin life 'normally', with a swimming frenzy that takes them away from their natal beaches, but they do not venture to the 'big blue'. They never leave inshore waters, preferring depths of 45m or less, and, as a result of their refusal to cross deep ocean basins, are confined to the Australian continental shelf.

Since the predator density is far higher here than in the open ocean, the turtles must hatch at a larger size to have a better chance of avoiding capture. And to supply enough yolk to nourish these big babies, female flatbacks must produce eggs that are disproportionately large. Due to the effort of producing these oversized eggs, the females lay roughly half as many per nest as other sea turtles.

## PROMISCUITY PAYS

Recent research has started to illuminate other ways in which flatbacks differ from their relatives. Genetic analysis of the eggs in each clutch has revealed that these turtles are more promiscuous: a nest may contain eggs fertilised with the sperm of up to four different males.

In this way, the females have the best chance of ensuring that at least some of their offspring will carry strong paternal genes. (They may also boost their chances of reproducing successfully by storing sperm for several years, as has been demonstrated in other turtles.)

If scientists were able to observe flatbacks' courtship behaviour, they might find it easier to interpret this information – but so far no one has identified where these quirky turtles mate. Pendoley, who has studied flatbacks for 14 years, tells me: "We still don't know anything about the adult males. I've never even seen one!"

Other species of sea turtle often mate directly off their nesting beaches, but flatbacks accomplish the act in secret at some other location before the females swim to their rookeries. "To be honest, we have barely started to unravel their behaviour," Guinea says.

Being little-known seems to have served flatback turtles well so far. The flip side of the coin is that, with virtually no population data, we don't know whether they're prospering or not. Flatbacks survived the dawn of the nuclear age under a cloak of mystery and neglect; if we can learn a little more about them, perhaps we can help them to survive the challenges of the 21st century. 🐢

## 📌 FIND OUT MORE

For information about the conservation of sea turtles in Australia, visit [www.austurtle.org.au](http://www.austurtle.org.au), [www.conserveturtles.org](http://www.conserveturtles.org) and [www.wwf.org.au/ourwork/oceans/turtles](http://www.wwf.org.au/ourwork/oceans/turtles)



# PURPLE *Reign*







With a wingspan of up to 9cm, the purple emperor is our second-largest butterfly, after the swallowtail. The males' iridescent sheen is only visible from certain angles.

Britain's most sought-after butterfly, the purple emperor, is fussy, feisty and very fond of faeces. You have to seek it with the eye of a hunter and the resolve of a pilgrim, says **MATTHEW OATES**.

**E**lusive, mysterious and regal, the purple emperor should be our national butterfly. It often seems too exotic for our islands, but is British – truly, madly and deeply. 'His Imperial Majesty', as Victorian butterfly collectors called this magnificent insect, has a unique standing in our natural history, country lore, literature and verse.

The butterfly's English name has a real resonance, for in ancient Rome only the emperor himself wore purple. Its scientific name, *Apatura iris*, also has poetic depth. Iris, who appeared in the guise of a rainbow, was the messenger of the Greek gods, while 'apatura' alludes to the Greek word for deception.

I fell under the purple emperor's spell as a 10-year-old, when a school housemaster read BB's story *Brendon Chase* to a dormitory full of boys on summer evenings. The book's message was simple: in nature we belong. I didn't drift off to sleep, but into wonderland – and never really came back.

Six years later, at 5.15pm on 5 July 1970, I glimpsed my first emperor, high over oaks in a wood near that school in the Sussex Weald. Captivated, I returned unacceptably late to school and got into Big Trouble, but was back in the wood the following day. No one forgets their first encounter with this lovely leviathan of an insect.

### OBSESSIVE QUESTS

Make no mistake, the purple emperor refreshes the parts that other butterflies cannot reach – not even the neurotically rare large blue or the haughty swallowtail. People prone to obsessive quests are particularly vulnerable. Ian Heslop (1904–70), a Cambridge classicist by training, prematurely terminated a successful career in colonial Africa to return home to pursue this evasive insect. He attempted to capture every specimen that flew within reach of his huge net, which was equipped with a 10m-long handle.

Later, Heslop was the lead author of *Notes and Views of the Purple Emperor*, a remarkable monograph published in 1964. This was the first attempt at an ecological study of a British butterfly and is probably the book that I would take with me to the mythical desert island.

Elusiveness is key to the purple emperor's appeal. It lives at neck-ache-inducing height among the treetops, breeds out of sight in tall sallow (pussy willow) bushes, seldom visits flowers, is prone to lengthy periods of indolence and almost invariably occurs at low population densities. The most individuals I have ever seen in view at once is seven. ▶



Purple emperor caterpillars have pale markings that resemble the veins of the willow leaves on which they feed.



## THE EXPERT

### MATTHEW OATES

is an ecologist at the National Trust, with a special interest in butterflies. He has followed 'His Imperial Majesty' since he was a child.



Yet this creature rewards the patient naturalist by occasionally, thrillingly, exploding into action, and a growing band of aficionados is now committed to deciphering its behaviour. Cracking its ecology involves some hard science, combined with a heady journey into the nether regions of natural history, poetic experience and the absurd.

## UNRAVELLING MYSTERIES

In Britain, the purple emperor's flight season begins around Midsummer's Day (24 June) and may last up to a month. Though its colonies are notoriously difficult to locate, there are two well-established survey techniques. You can search for male territories in July at sheltered high-point situations – of which more later – or look for the caterpillars in early autumn on their favoured types of willows.

We have made several significant findings in recent years. One is that the male butterflies' activity slows down considerably when all of the females have emerged and mated (though in hot weather older females may mate a second time). Another discovery is that the purple emperor is not necessarily a woodland butterfly, let alone one confined to ancient oak forests, as was previously believed.

The species has been found happily breeding in open landscapes with a scattering of copses and willow-lined

hedges, as well as in old, uncultivated fields colonised by willow saplings. Its caterpillars have even been spotted at Clacket Lane service station on the M25.

During periodic range expansions associated with good summers, the purple emperor

also visits the fringes of suburbia. At times it can prove a great wanderer: a few years ago, a female was found squashed on the steps of the High Court in London. And enthusiasts have further augmented the species' natural wanderlust by establishing new populations outside



its core range in central parts of southern England. They breed the butterflies in captivity, then release them in suitable spots on the quiet.

## GLADIATORIAL MALES

Male purple emperors can be highly territorial. They detest each other, waging spectacular aerial dogfights as they clash and chase one another above high-point territories – sacred groves used year after year. Territories are usually centred on 'summit' trees, either broadleaved or coniferous. These are sheltered from the prevailing wind by taller trees to the west (that is, they are situated just to the east of the highest point of the canopy, sometimes along a woodland edge).

When the butterflies are in full attack mode, they will launch themselves at virtually anything winged that enters their airspace. Birds on the 21st-century hit list include siskins, crossbills and all three species of woodpecker plus, astonishingly, buzzards, hobbies and red kites. The females will squabble among themselves while leading the amorous males a merry dance, and I have also seen the cantankerous caterpillars lock horns and attempt to wrestle each other off choice leaves.

During the early part of the flight season, in late June or early July, male purple emperors are seemingly capable of doing *anything*. I rescued one from a chemist's shop, where

## THE EMPEROR'S BREAKFAST

I have staged this piece of ecological performance art several times for butterfly enthusiasts and the BBC's cameras. (One such escapade is chronicled by Patrick Barkham in his wonderful book *The Butterfly Isles*.) Passing dog-walkers are perplexed by the sight of trestle tables in a woodland clearing, bedecked with paper plates bearing such offerings as horse poo, rancid cheese, rotten fruit, shrimp paste and stinking fish. Eccentricity is part and parcel of these picnics: the guests of honour are, of course, insects. Perhaps we entomologists need an official silly season?

Horse dung is irresistible to purple emperors.



Preparing a feast for a rather special insect.





The female butterflies lack a purple iridescence, so can be confused with white admirals. This one is nectaring on marsh thistles – an unusual sight, as adults rarely visit flowers.

Caterpillar: Colouria Media/Alamy; female: Peter Entwistle/FLPA

## EMPERORS ATTACK VIRTUALLY ANYTHING WINGED IN THEIR AIRSPACE, INCLUDING BUZZARDS AND KITES.

it was generating mass hysteria, and I know a landowner who was converted to the 'purple persuasion' when accosted in his tractor cab by a posse of inquisitive, pugnacious males.

Butterfly collectors of yesteryear used to exploit the insects' fondness for visiting putrid excrescences on

the woodland floor. On hot mornings they would stake out gamekeepers' gibbets and muddy puddles, willing their prize to turn up. This was the species they wanted most.

The same is true of the contemporary army of butterfly photographers, who patrol certain woodland rides on July mornings in the hope of obtaining the perfect, wings-fully-open picture of a pristine male showing full purple. Never mind the fact that the resulting image is often of an insect imbibing something unsavoury.

Every year in early July, more than 2,000 enthusiasts visit Fermyn Woods in Northamptonshire (see p69) to photograph the male purple emperors that descend in numbers to breakfast along the maze of rides. Dog and fox faeces are the favoured foodstuffs here, together with more mundane damp patches on the woodland floor.

In keeping with entomological tradition, an array of esoteric baits are also deployed. Oriental shrimp paste is currently in vogue; this works best when diluted into a spray or a liquid for pouring onto the ground, particularly in hot weather. Elsewhere, the roof of the interpretation board at Bentley Wood nature reserve near Salisbury in southern Wiltshire is adorned annually with banana skins, as an offering to the gods of the July forest skies.

### SHADES OF GREEN

So much for the showy, if enigmatic, adult butterflies: what about the rest of the purple emperor's life-cycle? Unravelling the ecology of the species' immature stages has proved to be a far more tortuous process.

Female purple emperors are exceptionally fussy. They will only lay their eggs on sallows, and the sallows themselves consist largely of highly variable hybrids, only a handful of which are favoured. Moreover, the butterflies only deposit their eggs on sprays that are mid-green in colour and of medium thickness, have matt upper surfaces and are not too hard in texture. These foliage characteristics tend to develop in moderately heavy shade – sallows screened by tall trees to the south are preferred.

In autumn, the emperor caterpillars create diagnostic feeding marks either side of the leaf tips on which they



# LIFE-CYCLE FROM EGG TO ADULT

Illustrations by Dan Cole/The Art Agency

## EGG

Female butterflies lay eggs in July on shaded willow leaves; these hatch after 12–20 days, depending on the weather. The eggs are blue-green at first, but soon change to pale green with a dark basal band, turning uniformly dull before hatching.



## LARVA

The larval stage lasts from late July or August to the following May or June, and half of this period is spent in hibernation. In late summer and early autumn, the caterpillars rest on leaf tips, often where raindrops accumulate, feeding sporadically and adopting the hue of their host leaf. They gradually change colour before hibernating on stems, subtly matching their background, then green up again in spring and feed voraciously during May, attaining the size of an adult's little finger.



## PUPA

This is the least understood stage. The chrysalis is probably formed on the underside of a willow leaf, most likely high up on the tree. We know from observations made in captivity that pupae hatch in 12–30 days.



## ADULT

The adult butterfly, or imago, has a flight season that starts in late June and ends in early August. Adult emperors are most numerous during the first week of July.

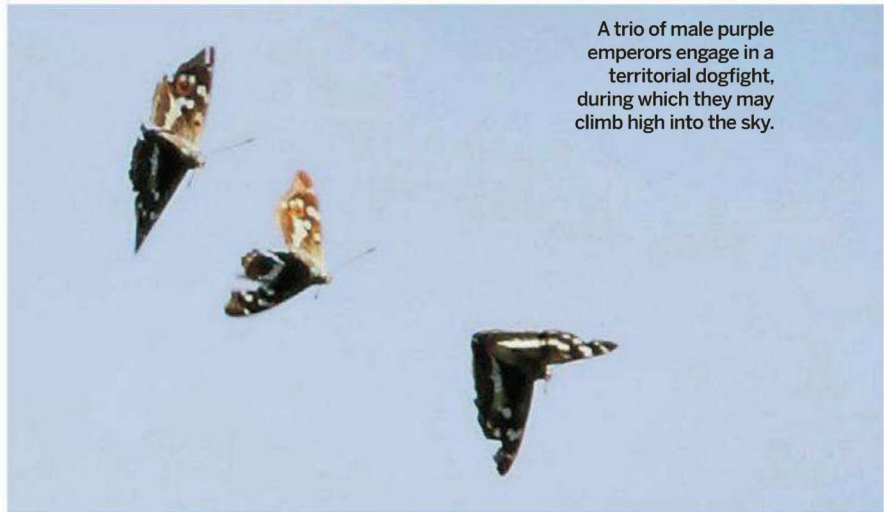


► Learn more about butterfly metamorphosis in this month's Big Question on p92.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Egg												
Caterpillar												
Pupa												
Adult												



Male emperors visit the ground to drink and feed about mid-morning, often between 10am and 11am.



A trio of male purple emperors engage in a territorial dogfight, during which they may climb high into the sky.

are resting. A painstaking search for this larval damage on suitable willow foliage is an effective survey method, at least after warm summers when populations are large.

## HIDE AND SEEK

Over the past three years, I have spent hundreds of hours following the fortunes of individual caterpillars in the wild. The larvae are masters of the cryptic arts, matching leaf colour perfectly, hiding in raindrops that gather on curled leaf tips and changing hue for the winter. They hibernate for five long months, beside buds on stems, tucked into forks and in fissures on small side branches.

But, despite an astonishing ability to blend into their background, the hibernating caterpillars are mercilessly predated – primarily, it seems, by tits. Two-thirds of the 58 hibernating larvae that I followed were predated, leaving behind only small, telltale silken resting pads.

Like a good scientist, I numbered the caterpillars in my study. But I felt that literary monikers were called for, too. So I named the first winter's batch after English poets, the second crop after minor Old Testament characters and the third after parts in Shakespearean tragedies. My sexing was a little off, though. Lot's Wife turned out to be Lot himself, while Ted Hughes transmogrified into Sylvia Plath.

Any caterpillars that do avoid the attentions of hungry tits grow rapidly in spring, matching the colour of fresh willow leaves. In late May or early June, they wander off to pupate and then, finally, they emerge as adults, ready to tantalise the waiting butterfly watchers. But, though I have learned much about the larval lives of purple emperors, their pupation remains an enigma. The emperor is always aloof, and loath to surrender his secrets. 🦋

## ① FIND OUT MORE

Discover more about Britain's most imperious butterfly at [www.thepurpleempire.com](http://www.thepurpleempire.com) and [www.butterfly-conservation.org](http://www.butterfly-conservation.org)





The underwings, which are similar in both sexes, are marked with an exquisite blend of chestnut, black and white.

## FIND YOUR OWN PURPLE EMPEROR

Visit these top spots in July for a butterfly encounter to remember.



### 1 Fermyn Woods, Northants

This country park is by far the best site in the UK for watching purple emperors, so is heavily visited. Walk into the woods from the main car park (where there is an excellent café) and look for the butterflies throughout the network of sunlit rides.

### 2 Broxbourne Woods, Herts

Here, the best plan is usually to park in the west car park at TL324070 and focus your hunt along the main ride leading from it. Alternatively, start your search at the east car park at TL328068.

### 3 Oakley Wood, Oxon

Purple emperors are often seen over and around the main car park off the Stanton St John to Oakley road, at SP612117. Also search along the adjacent rides.

### 4 Bookham Commons, Surrey

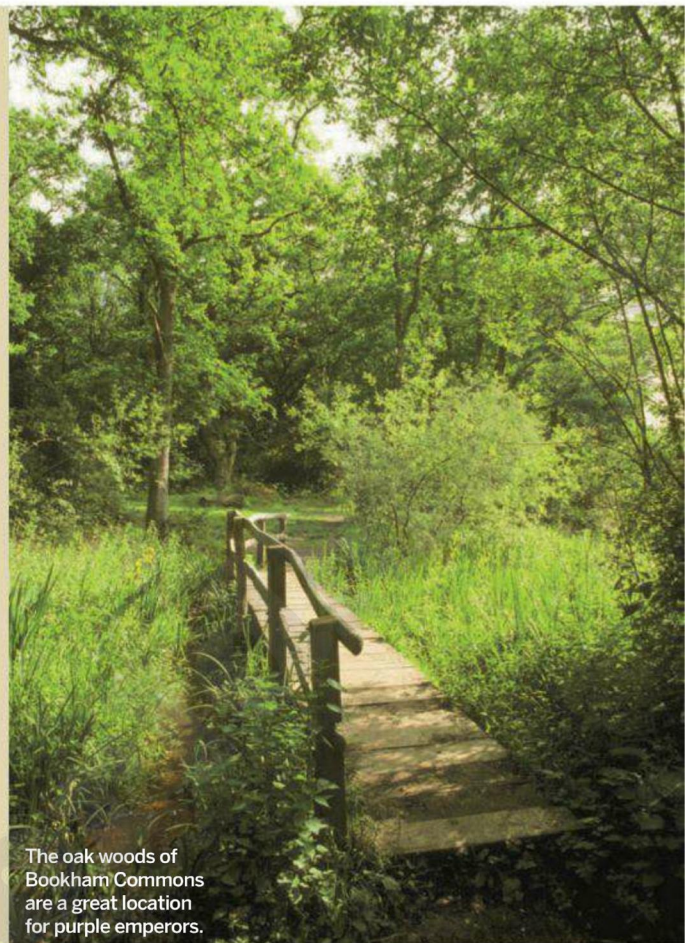
Each afternoon, male emperors gather at tall Turkey oaks at 'Mark Oak': park at the Tunnel House car park at TQ130556 and view from the adjacent ride (TQ133567). Also keep an eye out for white admirals and silver-washed fritillaries.

### 5 Alice Holt Forest, Hants

Try searching around the visitor centre and 'Go Ape' area, and along the easy-access trail. The males gather each afternoon over oak and chestnut trees at the north end of Goose Green Inclosure; view from SU805416.

### 6 Bentley Wood, Wilts

This popular site is managed specifically for woodland butterflies. Emperors are regularly seen in and around the main car park at SU258292, and along the switchback track that runs past it.



The oak woods of Bookham Commons are a great location for purple emperors.





WorldMap.net





# BY THE RIVERS OF BORNEO

Remote and uncharted, Maliau Basin in Malaysian Borneo is a location as mysterious as it is magical. It's a haven for wildlife, and has almost as many waterfalls as it does leeches – which is more than enough, says photographer **Nick Garbutt**.

**ABOVE**  
Exposed layers of ancient sedimentary rock create the stepped appearance of many of the Basin's cascades – here, Giluk Falls.

**LEFT**  
Reticulated pythons are often found near water in the Basin's lowland forest areas. Small individuals, such as this one, are adept climbers.

## THE EXPERT

### NICK GARBUTT



is a wildlife writer, tour leader and award-winning photographer. He first ventured into the Bornean rainforest 20 years ago, and has been enthralled ever since.

If time travel were possible, would you go forwards or backwards? Hankering after the bygone golden age of exploration, I'd go back, to follow in the footsteps of Wallace, Stanley, Speke and other pioneers – as long as my cameras could come with me.

Today, there are few places on the planet that are truly out of reach; restrictions limiting visits to many spots tend to be time and the depth of your pocket. Yet there are still some remote enclaves that conjure mystery, intrigue and even foreboding in a way that inspired the adventurous spirits of those famous trailblazers. One such place is Maliau Basin, in the heart of Malaysian Borneo – Sabah's 'Lost World'.

A giant, rainforest-cloaked amphitheatre over 25km across and covering more than 390km<sup>2</sup>, the Basin was not discovered until 1947, when a light aircraft nearly crashed into one of its mist-shrouded cliffs. The first scientific exploration took place in 1982, followed by a more thorough study in 1988. Documenting the extraordinary biodiversity of the region is an ongoing project, but so special are the findings that Maliau Basin has been nominated for World Heritage Site status.

Hundreds of streams tumble down the Basin's steep sides, plummeting over precipitous rock edges to form breathtaking, multi-layered waterfalls. Particularly spectacular cascades include Giluk Falls, akin to a giant, sculptured water feature; the towering Takob-Akob Falls, which plunges into an extensive rocky hollow; and the



AFTER DARK, OUR CAMPS  
WERE PERIODICALLY  
INSPECTED BY CURIOUS  
BEARDED PIGS.







#### FAR LEFT

Mighty three-horned rhinoceros beetles, among the largest in the world, are found in many parts of the South-East Asian rainforest. Males are intolerant of each other and use their 'horns' to joust, aiming to flip their opponents off the branch.

#### LEFT

It's a challenge to make out canopy-dwelling birds such as the green broadbill in any of Borneo's forests, but especially in Maliau Basin. Canopy walkways and towers (such as the Sky Bridge near Belian Camp and the observation tower at Nepenthes Camp) are good places to start.

#### ABOVE

Bearded pigs are normally shy and rarely seen, but these youngsters were frequent visitors to Nepenthes Camp, where they supplemented their omnivorous diet by scavenging for vegetable matter in the rubbish pit.



seven-tier Maliau Falls, in the heart of the Basin, epitomising incredible raw power and energy.

After a number of thwarted attempts, I finally made it to Maliau Basin in May 2011. Carrying the basic necessities for a week in the forest, I set off with a local guide and porter. The first three hours' hike, from Agathis Camp to Nepenthes Camp, set the tone – a steep climb through dense forest to the southern plateau. Here, the habitat changed dramatically to open heath forest, known locally as *kerangas*, dominated by stunted oak, chestnut and laurel.

Pitcher plants flourished on the impoverished soils – six species (genus *Nepenthes*) have been recorded here, often growing in such profusion that they resembled something from the Chelsea Flower Show. I wandered open-mouthed through one stand of trees, their trunks hijacked by lavish

#### ABOVE

The heath forest on the southern plateau supports some of the Basin's richest groves of pitcher plants. So profuse are they that some species hybridise. These magnificent individuals may be hybrids of *Nepenthes stenophylla* and *N. veitchii*.



NOWHERE ELSE HAS GIVEN  
ME QUITE THE SAME  
FEELING OF ISOLATION  
AND EXHILARATION.



WorldMaps.net



**LEFT**

*Mormolyce borneensis* scuttles across a decaying leaf on the rainforest floor near Ginseng Camp. The five species in the genus are known as violin beetles – a nod to their resemblance to the instrument.

**ABOVE**

A real master of disguise, the Bornean horned frog inhabits lowland and mid-altitude rainforest. Males generally call from the vicinity of streams, and their loud, resonant honks can create a noisy chorus lasting up to 30 minutes.

**LEFT**

Riverine ferns often dominate the margins of lowland forest streams. They look delicate, but can withstand regular bashing by brutal floodwaters.

**ABOVE**

The crested wood partridge is hard to spot, but this one made a rare (and noisy) visit to Ginseng Camp. It attempted to roost on a tin roof before sliding off into a bush.

**NOW YOU DO IT****GETTING THERE**

► There are no direct flights from the UK to Kota Kinabalu, capital of Sabah. **Malaysia Airlines** ([www.malaysiaairlines.com](http://www.malaysiaairlines.com)), **Cathay Pacific** ([www.cathaypacific.com](http://www.cathaypacific.com)), **Royal Brunei** ([www.bruneiair.com/uk](http://www.bruneiair.com/uk)) and **Singapore Airlines** ([www.singaporeair.com](http://www.singaporeair.com)) fly via Asian hubs. ► Local airlines, including **Air Asia** ([www.airasia.com](http://www.airasia.com)), fly from Kota Kinabalu to Tawau. ► **Maliau Basin** is accessible by road (4WD required) from Kota Kinabalu and Tawau. However, it is very remote and its few camps are permit-only, so it is best to join a tour.

**WHEN TO GO**

► Expect rain year-round. Avoid August–September and November–December, which are particularly wet. It's best to visit during the 'dry' season (April–May).

**HEALTH AND SAFETY**

► You need to be **fit**. It is hot and humid, and the treks are strenuous.

**OTHER PLACES TO VISIT**

For a more accessible rainforest experience, try the **Danum Valley** (above) for orangutans and tarsiers, or the **Kinabatangan River**, good for proboscis monkeys and Borneo pygmy elephants.

**FURTHER READING**

► **A Field Guide to the Mammals of Borneo** by J Payne & CM Francis (Sabah Society, 9789679994711, RRP £27.50, W0712/09). ► Buy this book on p85.

spirals of *Nepenthes veitchii*. Each pitcher sported an extravagant shawl collar of red, gold or green.

Each morning, low cloud and mist swirled around the canopy, creating that ethereal atmosphere only rainforests possess. But even when the fog lifted, it was clear that animals – large ones, at least – would be tough to see. I heard Bornean gibbons several times, yet only caught a fleeting glimpse of an adult before it melted into the trees with effortless, arm-to-arm swings. I had brief views of a troop of maroon langurs, but the second they saw me they bounded off into the canopy with a volley of agitated alarm calls and a flash of orange fur. And while our camps were periodically inspected by curious bearded pigs and the occasional Malay civet, their visits were always after dark.

So I concentrated instead on smaller, often overlooked species – of which there is an abundance in the Basin. Stingless bees built delicate funnel nests from tree trunks, horned frogs hid in the leaf litter, a baby reticulated python knotted itself around a twig and – in the heath forest – a spectacular red and blue orb-web spider patrolled the pitcher plants in search of prey. For other invertebrates, I was supper: most evenings I had to pull at least 30 leeches off my trousers and leech socks.

I've been fortunate enough to visit many of the world's renowned wild places, but nowhere else has given me quite the same feeling of remoteness, isolation and exhilaration. This must have been a routine state of mind for those pioneering explorers – even though the leeches ensure you are never totally alone. 🦋





# TALON CONTEST

*by Staffan Widstrand*

Flatanger, on the coast of Norway some 100km north of Trondheim, is a honeypot for wildlife photographers. Golden eagles, goshawks, black grouse and capercaillie leks, elk, eagle owls and a host of mountain birds and seabirds delight visitors – but the real stars are the white-tailed eagles. Over the past 20 years, famed ‘Eagle Man’ Ole Martin Dahle has been feeding these imposing birds; a dozen pairs regularly visit the spot, and as many as eight have been seen in a single day. On this cold February morning I was fortunate to watch a pair of young birds battling over food in a breathtaking aerial skirmish.

Staffan Widstrand



# exposure

The image that most amazed us this month



WorldMag.net



BBC WORLDWIDE PRESENTS

# planet earth

## IN CONCERT

GEORGE FENTON  
PHILHARMONIA ORCHESTRA  
HALEY GLENNIE-SMITH



Photo: BBC Concert Orchestra.

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CONCERT HALL  
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9TH\* SEPT  
**CARDIFF**

WALES MILLENNIUM  
CENTRE  
029 2063 6464

13TH-14TH SEPT  
**BIRMINGHAM**

SYMPHONY  
HALL  
0121 345 0600

15TH\* SEPT  
**MANCHESTER**

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HALL  
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16TH SEPT  
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### TV Plus

Previews and behind-the-scenes insights [p79](#)

### Books

The month's best wildlife reads reviewed [p83](#)

### Q&A

Expert answers, new discoveries, quirky facts [p87](#)

### The Big Question

Metamorphosis - how it works [p92](#)

Rare raptors, such as this red-footed falcon, fly over Malta on their spring migration. As the sun sets, many make landfall to roost in the trees – if they're not shot down first.



### RADIO PREVIEW

## JOURNEY'S END

### MALTA'S SPRING HUNT (TBC)

**4** COMING SOON. SEE *RADIO TIMES* FOR DETAILS

Situated in the Mediterranean Sea, Malta provides a vital rest-stop for millions of birds making the arduous spring migration from Africa to their breeding grounds in Europe.

Yet the islands extend no cordial welcome to these weary travellers. The Maltese spring hunt is a deep-rooted tradition, and for two weeks each April, the migrants are hailed only with bullets. For many, the journey ends here.

Hunting birds in Europe during their spring migration and breeding period is illegal under the EU Birds Directive, but Malta exercised its right of derogation in 2004 in order to permit the spring hunting of turtle doves and quail – the former are in severe decline across the region.

Though the derogation operates under strict rules (hunters need a licence; have daily and season 'bag' limits; can't shoot other species; and must report their kills), Radio 4's Matthew Hill reports that

some hunters not only exceed their quotas but also target birds indiscriminately, firing on protected species such as marsh harriers, honey buzzards, red-footed falcons and lesser and common kestrels. This year, BirdLife Malta recorded more than 730 illegal hunting incidents; many more probably passed under their radar.

This complex, contentious topic is tackled in a new half-hour documentary for Radio 4. Matthew and researcher Ruth Peacey visit Malta to witness the impact of the hunt, interviewing

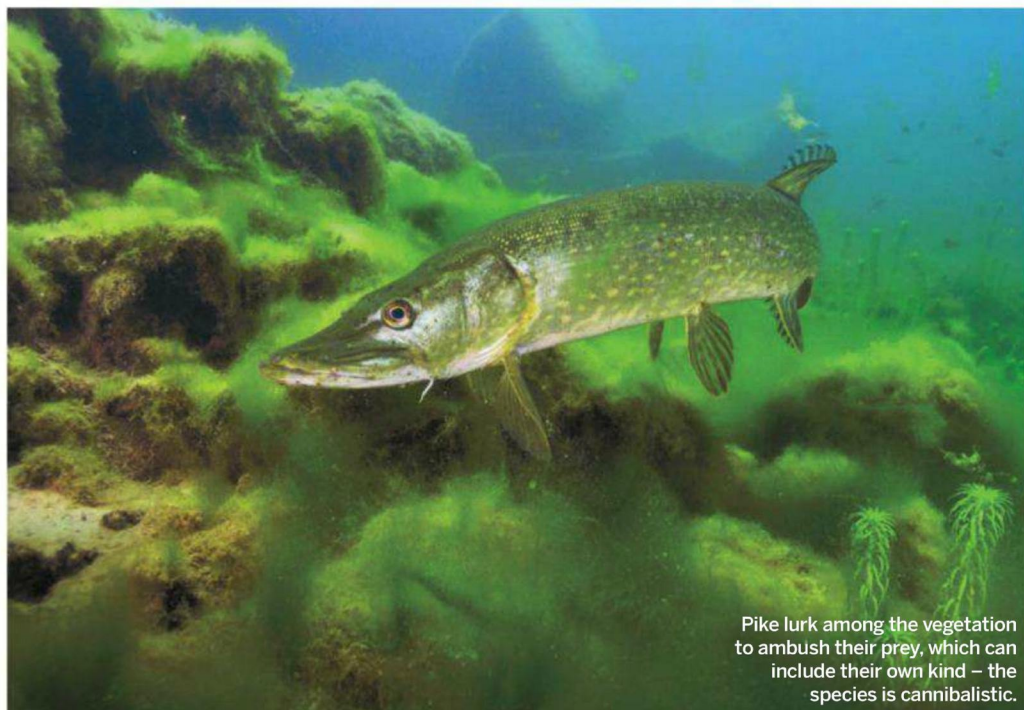
those at both ends of the guns – notably Joe Perici Calascione, the president of FKNK, Malta's main hunting federation, and Ray Vella, a BirdLife Malta ranger who was hit in the face by a bullet in 2009.

"The issue here is not hunting per se; it's the illegal shooting of birds during the spring hunt," says Ruth. "These are breeding individuals that have survived the winter and the migration so far, and as such are vital to the future of their species. People see Malta as an idyllic holiday destination, but it has a much darker side."

**Sarah McPherson**

**RADIO  
CHOICE**





Pike lurk among the vegetation to ambush their prey, which can include their own kind – the species is cannibalistic.

## BEHIND THE SCENES

# UNDERWATER LOVE

*Springwatch* producer **Bill Markham** on filming the courtship of Britain's 'barracudas'.

This year, *Springwatch* sees BBC producer Bill Markham and TV presenter Iolo Williams head to Stoney Cove, a flooded quarry in Stoney Stanton, Leicestershire, to witness the freshwater spectacle of pike 'grouping'.

### What made you want to film pike?

It was actually Iolo's idea – he'd always wanted to swim with pike. They are fascinating fish – menacing-looking predators that, in spring, perform this exciting but little-known courtship ritual.

We also wanted to highlight the fact that spring occurs underwater as well as above it

– fish respond to the changing seasons just like other animals. It's a more gradual process, though, because the water acts as a buffer against daily temperature changes.

### Why did you choose Stoney Cove?

It contains plenty of pike and visibility is excellent – about 7m. It's also an interesting setting. Because it's a major dive centre, various wrecks have been sunk there, including vans and a plane.

Despite its former life as a dusty old quarry, Stoney Cove is now teeming with fish and plants, particularly Canadian pondweed,

which the pike use as cover to ambush prey and as a place to deposit eggs. It's amazing how an artificial habitat can nurture wildlife.

### What spurs the grouping?

When the temperature of the water reaches 8–9°C, the females swell with eggs – at which point the males start to show

an interest. Pike are normally territorial and won't venture into another's patch, but at this time that behaviour breaks down.

### How did you follow the pike?

We didn't have to. They can be skittish, but the individuals we filmed were focused intently on the female. The drama played out right in front of the crew – from the surface, I barely saw their bubbles move.

### What was the biggest challenge?

The shoot was hard to direct. There were already four people in the water – Iolo, and the film crew. So I stayed in the boat, from where I could hear, but not see, what was going on as Iolo did pieces to camera.

The timing was also a major challenge, because grouping happens for just a few days each year. **Sarah McPherson**

### DON'T MISS IT...

**Springwatch** is airing now. Catch up with any episodes you missed on BBC iPlayer.

## 3 THINGS WE LOVE THIS MONTH

### BOOKS

#### EYE ON THE WILD SERIES

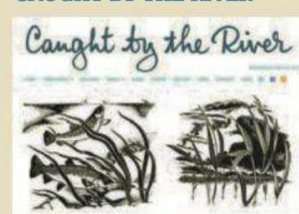
One of BBC *Wildlife*'s regular photographers, Suzi Eszterhas, has launched a series of books that explore the family life of some of the world's most charismatic mammals. Brown bears, cheetahs and gorillas, to name a few, are all photographed in the wild. The text will appeal to readers aged six and up.

► [www.franceslincoln.com](http://www.franceslincoln.com)



### WEBSITE

#### CAUGHT BY THE RIVER



Its founders created Caught By The River in 2007 to celebrate the countryside, and the site has grown steadily in scale and scope. It now features articles by an eclectic mixture of writers on topics as varied as bird art, haiku, and food and drink.

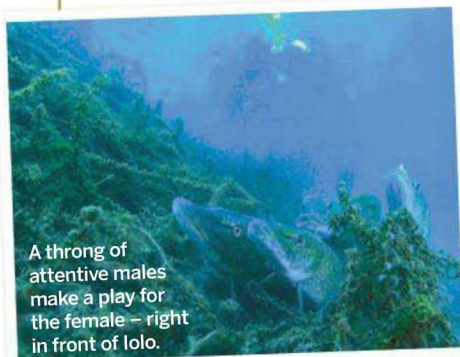
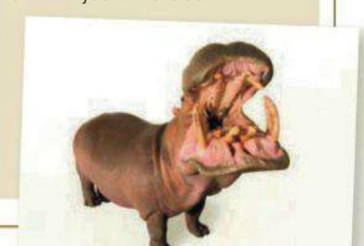
► <http://caughtbytheriver.net>

### PHOTOGRAPHY

#### THE BIODIVERSITY PROJECT

Photographer Joel Sartore is on a mission to document some of the world's rarest species before they disappear. His close-up portraits of zoo animals against plain backgrounds show his subjects in stunning detail, and emphasise that every creature is worth saving – even ones the size of a thumbnail.

► [www.joelsartore.com](http://www.joelsartore.com)



A throng of attentive males make a play for the female – right in front of Iolo.



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*Image courtesy of Wendy Ball*

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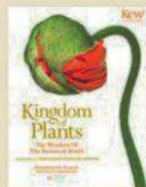
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The complexity and variety of flowers, like these coneflowers, drove the evolution of diversity in their animal visitors.



## KINGDOM OF HEAVEN

The companion to Sir David Attenborough's new TV series on plants demands to be read.

### KINGDOM OF PLANTS

By Will Benson

Collins, 256pp, ISBN 9780007463336 (hb)  
£24.99/£17.99 Code W0712/03

Books that accompany TV series are sometimes little more than souvenirs of an enjoyable viewing experience. But *Kingdom of Plants*, written to complement Sir David Attenborough's new 3D series for Sky, is valuable in its own right.

In a text that couples strong narrative with the latest scientific insights, Will Benson has produced an engrossing account of the evolution of plant life and its importance to our planet's past, present and future.

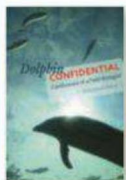
He takes us on a beautifully illustrated, three-billion-year journey from the origins of photosynthesis in the oceans,

following plant evolution from its beginnings in moss-like ancestors to the glorious botanical diversity found in tropical ecosystems today.

We meet naturalists and scientists whose landmark observations revealed that plants played a key role in generating animal diversity. They created the environment and ecological niches that fauna occupy and, in many cases, exploit animals' adaptations to ensure their own survival by pollinating flowers and dispersing seeds. And, as Benson eloquently concludes in his final chapter, the future of plant life determines the destiny of our own species.

Verdict ★★★★★

Phil Gates Botanist



### DOLPHIN CONFIDENTIAL: CONFESSIONS OF A FIELD BIOLOGIST

By Maddalena Bearzi

University of Chicago, 197pp,  
ISBN 9780226040158 (hb) £16.99/£14.50  
Code W0712/02

Maddalena Bearzi studies wild dolphins for a living, but it's not the romantic job that you might expect. In this beautifully written account she reveals what is *really* involved.

As we follow Bearzi's journey from her childhood in Italy to becoming a marine mammal biologist in California, we discover the less glamorous side of working in this field – including tedious hours spent on land analysing data, and

being hit by a disgusting deluge of polluted water while kayaking in a harbour.

The author interweaves stories of encounters with common, striped and bottlenose dolphins, hawksbill turtles and California sealions with colourful anecdotes about the people who have influenced her. These include Enzo, her first boat captain, and the late John Heyning, her mentor from the Natural History Museum of Los Angeles, who curated one of the world's largest collections of marine mammals and who encouraged Bearzi to turn her passion into a PhD.

This inspiring book captures the ups and downs of life as a field researcher – useful for anyone considering a career in marine biology, and interesting for anyone who loves dolphins.

Verdict ★★★★★

Ruth Peacey BBC researcher,  
*Natural World* series



### TROUT

By James Owen

Reaktion, 190p, ISBN 9781861898777 (pb)  
£9.99/£8.50 Code W0712/01

The nation's amateur naturalists tend to neglect our freshwater fishes. This is a pity, because the lives of these beautiful creatures are full of interest.

With a few exceptions in southern Britain, our current piscine populations derive from species that invaded our river systems at the end of the last ice age. Among them was the subject of the latest in Reaktion's superbly illustrated series of monographs.

Much of the charm of James Owen's book lies in its breadth. A discussion of the part the trout has played in our cultural history

is combined with an accurate account of its natural history. The reader meets as varied a cast of characters as has ever been brought together in a book about a fish. Lovesick nuns, long-dead saints, straight-shooting colonists recreating the streams of their distant homeland, even a jazz singer renowned for his colourful lifestyle – all earn their place because of their love of trout and the wild places where they swim.

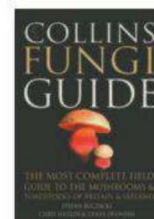
Entertaining as the human stories are, the real star of Owen's book is, of course, the trout itself which, even in the 21st century, has not lost the power to surprise. Did you know that researchers have recently discovered that spawning female trout sometimes use false orgasms to provoke less-fit males into premature ejaculation? No doubt the singer would have understood, but what would the nuns have said?

Verdict ★★★★★

Richard Shelton Writer



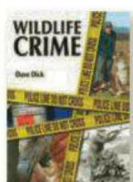
PICTURE  
BOOK  
CHOICE



**COLLINS FUNGI GUIDE**  
By Stefan Buczacki, Chris Shields & Denys Ovenden

The sixth instalment in Collins' bestselling 'Black' series of ID guides focuses on European mushrooms and toadstools. More than 2,400 species are described and illustrated, including artwork of both young and mature fruiting bodies where helpful. A paperback edition follows in the autumn.

Harper Collins, 640pp.  
ISBN 9780007242900 (hb)  
£35.00/£27.99 Code W0712/04



## WILDLIFE CRIME

By Dave Dick  
Whittles, 196pp, ISBN 9781849950367 (pb)  
£18.99/£15.99 Code W0712/05

Dave Dick encountered his first live golden eagle just a week before he found one dead from poison. That shocking contrast sums up his long career as the RSPB's senior investigations officer in Scotland. *Wildlife Crime* is a no-nonsense memoir that weaves 25 years of battling criminals into a gritty account of life on the frontline.

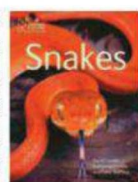
And make no mistake – it is a war, waged between eggheads,

thieves, poisoners and greedy landowners on one side, and a band of equally determined and increasingly successful conservationists on the other. More arrests, bigger fines, enlightened police officers, DNA fingerprinting, international co-operation: throughout the 1980s and 90s, Dick and his colleagues scored notable victories against the criminals. His forensic accounts make sober, fascinating reading, and revelation is tinged with a hard-won, dry humour.

But in his concluding chapter Dick sounds a caution, echoed by John Lister-Kaye's foreword: the killing continues. Both hope that the book will "reignite the public debate and media coverage" of illegal bird-killing. Indeed, it must.

**Verdict** ★★★★★

John Fanshawe Conservationist



## SNAKES

By David Gower, Katherine Garrett and Peter Stafford  
NHM, 144pp, ISBN 9780565092665 (pb)  
£12.99/£10.99 Code W0712/06

Providing an overview of snake evolution, ecology and biology in one relatively short book might seem a tall order. But this introduction to the subject is both engaging and attractive.

The authors touch on the fossil record briefly before discussing the main characteristics of snake morphology and behaviour.

Most of the book is taken up by descriptions of snake families,

presented in a clear and accessible way and preceded by a very useful evolutionary tree. Classification features strongly throughout and is bang up to date, with frequent acknowledgement that snake taxonomy is ever-changing. Embedded within the chapters are page-long discussions of interesting issues such as convergent evolution, mimicry and island vipers.

The accompanying photos excellently portray the beauty and diversity of the snake world. There are also diagrams that put many more technical books to shame.

All in all, *Snakes* is a vivid, colourful and exciting look at this fascinating group of animals, perfect for beginners but with plenty to delight old hands.

**Verdict** ★★★★★

Gary Powell Herpetologist





Going rockpooling is an excellent way to introduce children to wildlife.

## BEST BOOKS ROCKPOOLING by BBC presenter and marine biologist Maya Plass



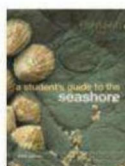
### THE ANATOMY OF THE SEA

By David Ponsonby and Georges Dussart

This charming book, written

by experienced biologists, is an evocative exploration of our long obsession with the sea. The authors combine quotes and illustrations from old books with new text in a compendium featuring more than 600 marine species. Inspiration is guaranteed.

Ivy Press, 288pp, ISBN 9781905695508 (pb)  
Buy second-hand from [www.amazon.co.uk](http://www.amazon.co.uk)



### A STUDENT'S GUIDE TO THE SEASHORE

By ID Fish and S Fish

This ID guide is aimed at the

marine biology student or advanced seashore naturalist. It is comprehensive and up to date, with simple black-and-white illustrations of over 650 species found in Britain. Descriptions are precise and informative, so you can identify with confidence.

CUP, 527pp, 3rd edn, ISBN 9780521720595  
(pb) £34.99/£29.99 Code W0712/07



### SEASHORE SAFARIS

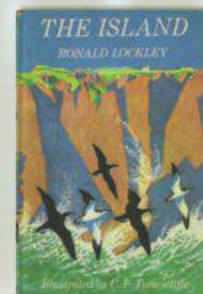
By Judith Oakley

The author's passion for photography and rockpooling makes

this the perfect pocket-sized guidebook for a family trip to the seashore. It clearly describes, in words and pictures, the habitats and species that are most likely to be found on a rockpooling foray, and includes plenty of practical advice.

Graffeg, 224pp, ISBN 9781905582525 (pb)  
£11.99/£10.50 Code W0712/08

## MY FAVOURITE BOOK



### THE ISLAND

CHOSEN BY  
TONY  
SOPER

When war was declared in 1939, Ronald Lockley had to leave his beloved Skokholm, off the coast of Pembrokeshire. But the island featured in his regular letters to John Buxton, a near-relative, who was a prisoner of war in Germany. *Letters from Skokholm* was the first of his books I read... and then I met the man himself.

In the early 1950s, while working in the embryonic Natural History Unit, I breezed in one day to find a dour Welshman in my chair. Half an hour later I was offering Lockley a lift home in return for a weekend expedition to ring razorbills on Skomer. He was great company: we ended up ringing auks, tagging grey seals, and landing on every beach and exploring every cave between Milford Haven and Strumble Head.

*The Island*, published in 1969, is a treasure trove of stories of the magical wildlife of Skokholm, and captures the immense charm and endless curiosity of this poet-naturalist. They don't make them like that any more.

Tony is a writer and broadcaster who co-founded the BBC's *Natural History Unit* in Bristol.

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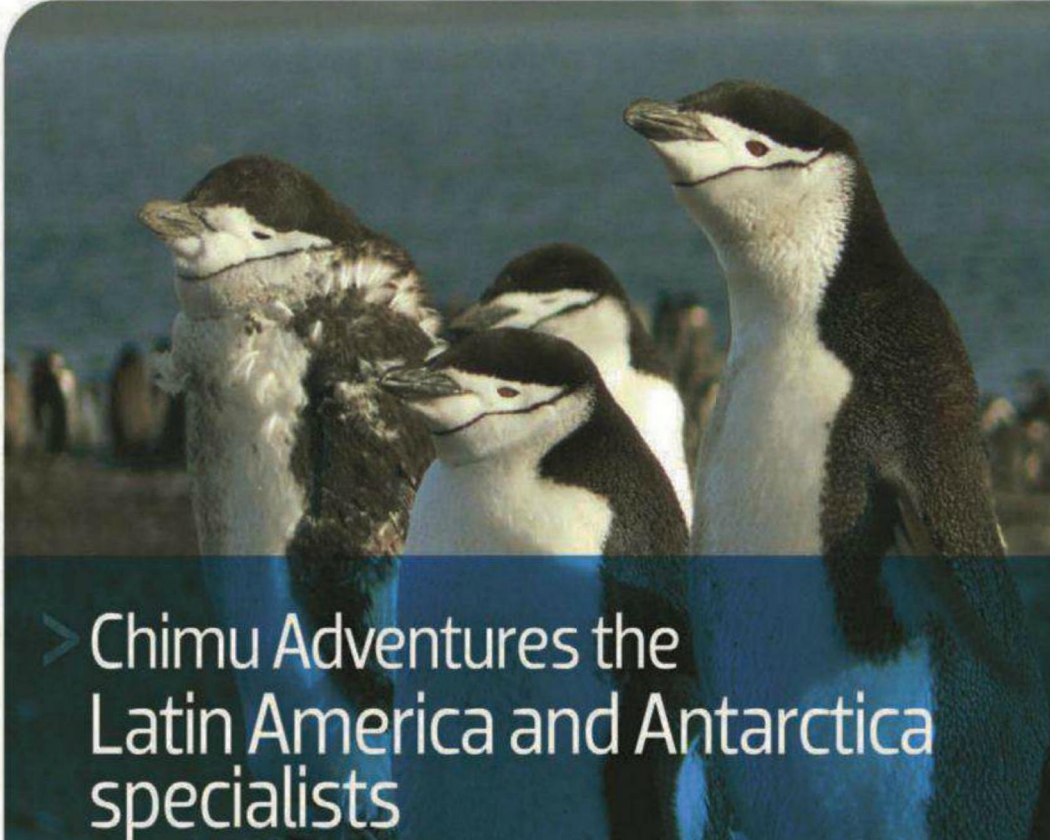
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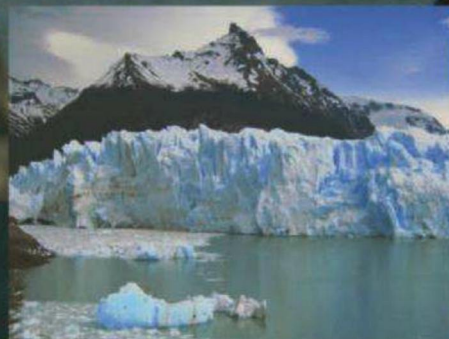
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## OUR EXPERTS



### STEVE HARRIS

Professor of biological sciences at Bristol University. Steve is one of the

UK's leading mammal experts. He writes about foxes on p46.



### JOHN WILKINSON

John is the research and monitoring officer for Amphibian and

Reptile Conservation, and runs the national recording scheme.



### STEPHEN MILLS

Stephen is a regular contributor to *BBC Wildlife* and a natural-history

film-maker. He wrote the award-winning BBC film *Wolf Saga*.



### RICHARD JONES

A former president of the British Entomological Society, Richard

now works as a surveyor and wildlife writer.



### PHIL GATES

A botanist and lecturer in biological science at Durham

University, Phil is also a regular contributor to *BBC Wildlife*.



### MIKE TOMS

Mike is head of garden ecology at the British Trust for Ornithology.

He has written and co-written several bird books.

## SEND YOUR QUESTIONS TO

Q&A, *BBC Wildlife Magazine*, Immediate Media Company, 4th Floor, Tower House, Fairfax St, Bristol BS1 3BN

OR EMAIL [wildquestions@immediate.co.uk](mailto:wildquestions@immediate.co.uk)

We are very sorry, but due to the high volume of questions we receive, we cannot acknowledge or answer them personally.

# Q&A

Your questions answered, plus the latest discoveries, fantastic facts and people who made natural history.

**Q** Is it true that male stoats mate with their own kits before the young leave the nest? If so, why?



By eight weeks old, young stoats are learning to hunt with their mother. The female kits will normally be expecting litters of their own.

**A** Not quite. A male stoat does mate with young females while they are still in the nest, alongside their mother – but they are not his offspring.

Remarkably, female stoats are sexually mature at just two to three weeks old, when they are still blind, deaf and naked. Stoat reproduction involves delayed implantation: after mating, in early summer, each fertilised

egg develops into a small ball of cells called a blastocyst, which does not attach to the uterine wall for nine to ten more months. Gestation is then brief, with a litter numbering six to nine kits arriving within four weeks of implantation.

Stoats probably employ this mechanism to ensure that the female gives birth at the ideal moment the following

spring, which then provides the maximum length of time for the youngsters to feed and grow before winter sets in.

Since there is a rapid turnover in the stoat population (average lifespan is one to two years), and stoats are not monogamous, those very young females with which a male mates are unlikely to be his offspring.

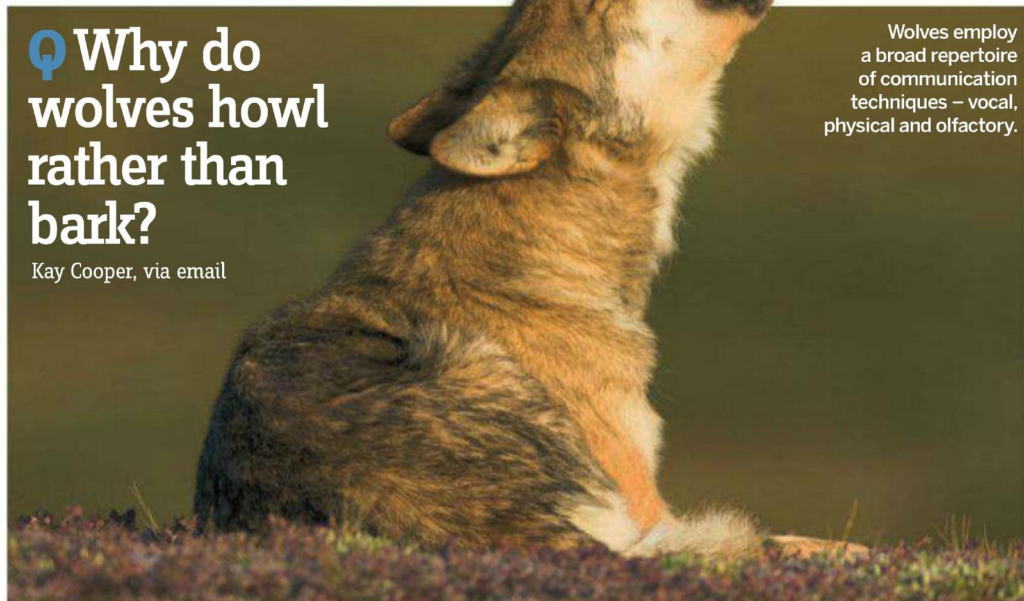
**Steve Harris** *Mammalogist*

Ortol Alamy/naturepl.com



## Q Why do wolves howl rather than bark?

Kay Cooper, via email



Wolves employ a broad repertoire of communication techniques – vocal, physical and olfactory.

**A** Actually, wolves do bark. Researchers have identified at least 11 types of wolf call – the yelp, whimper, whine, whine-moan, moan, growl-moan, growl, snarl, woof, bark and howl. With the exception of the howl, these are all short- to medium-range noises communicating intimate emotions, and are directed mainly at family members.

While the bark is used as a threat or protest – for instance, when a human or other large

predator approaches the den – howling is a relatively low-frequency, elongated call designed to carry over large distances. On the open tundra, wolves can hear a howl from 11km away.

Howling probably has four main purposes. It helps pack members to stay in touch and co-ordinate movements across their enormous home ranges (normally 200–600km<sup>2</sup>, but occasionally much larger); it enables groups to advertise their presence and

claim on a territory, avoiding unnecessary encounters with rivals; it may help lone wolves to locate potential mates; and, finally, it apparently strengthens social bonds within the pack when performed in chorus.

Young wolves can travel huge distances once they leave home. The record is held by a Minnesota female, who covered 4,117km in search of company. A good howl might have helped her.

**Stephen Mills** Wildlife writer

## Q Why are the toads in my pond so many different colours and patterns?

Frances Whitfield, Bedfordshire

**A** The skin colour of the common toad can, indeed, be very variable. This is mainly due to natural genetic diversity within the species.

Males in particular differ enormously in appearance and, in many years of surveying, I've

encountered numerous individuals that are noticeably paler than others. The contrast is more marked when the animals shift from terrestrial to aquatic mode for breeding: dark toads appear even darker in the water, a result of being wet.

I've observed extreme coloration in common toads, as well. In some areas, many females are brick red or even orange, and can be heavily marked with dark spots. I've even seen the occasional male with a large, bright orange spot.

Unlike most mammals, amphibians have polychromatic (multicoloured) vision, so they may be sending signals to each other that we humans simply can't interpret.

**John Wilkinson** ARC

Coats of many colours – male toads vary hugely in appearance.



## LATEST DISCOVERIES



### BEE'S NEEDS

When honeybee colonies are infected with a parasitic fungus that attacks their larvae, the workers self-medicate. They forage for antifungal resins produced by poplars and other trees, mixing them with the wax they use to build their nests.

*PLoS ONE*, DOI:10.1371/journal.pone.0034601



### TOILET CLEANER

After interring a mouse carcass to feed their larvae, burying beetles *Nicrophorus vespilloides* smother it with sticky anal secretions. These contain potent antimicrobial compounds that slow decomposition, doubling the survival rate of the young.

*J. Evolution. Biol.*, DOI:10.1111/j.1420-9101.2012.02486.x

### MEADOWS PIP IT

Eastern European flower meadows rival tropical rainforests as the world's most botanically diverse habitats. While South and Central American rainforests could not be matched for numbers of species in a single hectare (up to 942), over smaller areas the meadows clinched it (up to 89 per square metre).

*J. Veg. Sci.*, DOI:10.1111/j.1654-1103.2012.01400.x



## STRANGE BUT TRUE...

### Follow your nose

**W**ith its big brown eyes, dainty little nose and striking beauty spots, few hoofed mammals are as pretty as the klipspringer. But looking this good can attract the wrong sort of attention.

Those beauty spots are, in fact, preorbital scent glands. They ooze a dark, sticky liquid that the klippies paste onto the tips of twigs on shrubs and trees to advertise their territories to rivals. Several individuals may mark the same sites, producing globby balls of scent on the most popular sprigs.

Though this secretion is an effective means of communication, it also attracts a rather unwelcome visitor – the tick *Ixodes neitzi*, which taps neatly into the system. During the wet season, rain washes the gloopy deposits along the branches and down the trunk to the parasites on the ground, offering them a freshly perfumed path to a new host. Hordes of ticks head eagerly up to the twiggy launchpad, where they wait together, ready to hop aboard the next unwary klipspringer that deposits its scent.

**Stuart Blackman** *Science writer*



It may look like a poor attempt at hiding, but this klipspringer is scent-marking a twig.

### KLIPBOARD

#### ■ Klipspringer scent

glands also attract red-winged starlings and yellow-bellied greenbulbs, who peck at them for the secretions.

#### ■ Klipspringers are

strictly monogamous. Males and females rarely move more than a few metres apart.

#### ■ They walk on the

tips of their hooves and are agile climbers, able to scale steep rock faces and even trees.

#### ■ Their surprisingly

coarse fur consists of hollow hairs that rustle when disturbed.

Chris & Tilde Stuart/FLPA

Will Gater

## Q What are these caterpillars that I spotted on brambles near some dunes in South Devon?

Will Gater, via email

**A** These are caterpillars of the brown-tail *Euproctis chrysorrhoea*, a moth whose larvae live communally in a silken tent, emerging to feed at night. They defoliate swathes of hawthorn and bramble, and can be a serious pest of fruit trees.

Brown-tail caterpillars are protected from predators and parasites by their satiny shelter and tough, brittle bristles, which are hollow and contain a stinging venom that can bring susceptible people out in a painful rash.

**Richard Jones** *Entomologist*



## Q In spring, I counted at least 1,000 toothwort spikes at Arnside & Silverdale AONB. Is it unusual for the plant to flower so densely?

David Humphreys, Arnside

**A** This is an amazing display by a remarkable parasite. Toothwort is a flowering plant that depends on the roots of trees – usually hazel, but sometimes elm, ash or beech – to survive. It has no

roots, leaves or chlorophyll of its own, so when its seeds germinate they must be close to the host's vigorously growing roots, to plug themselves into their victim's internal root tissues before they

have exhausted their own limited food store.

It's not uncommon to find a dozen flower spikes on a single toothwort plant, but a population of this size in such a limited area must have resulted from exceptionally

favourable circumstances during seed germination – perhaps heavy rain exposed soft, young tree roots and washed numerous seeds into contact with them.

Once host and parasite are linked, the toothwort diverts its host's resources to feed its ghostly flowers, which burst through the soil for a few weeks in spring. They're pollinated by bumblebees, quickly produce seeds and wither away by the end of May, hiding all surface traces of their presence for another year.

**Phil Gates** *Botanist*



Toothwort flowers resemble rows of discoloured teeth – hence the name.

## WHAT'S IN A NAME?

### *Notnops, Tisentnops & Taintnops*

These three closely related genera of spiders from Chile were once lumped together within the genus *Nops*. They were subsequently given the designations of *Notnops*, *Tisentnops* and *Taintnops* in 1994 by the prolific American taxonomist Norman Platnick, in order to make it perfectly clear that they did not belong there. **SB**

David Humphreys



A male antler moth (right) interrupts a mating pair. Note the pattern on the forewings, from which the species gets its name.



## Q What are these three antler moths doing?

Ros Hancock, via email

**A** Moths use pheromones to locate each other, with the males usually smelling out the females. Only minuscule amounts of chemical are needed – the highly sensitive chemoreceptors in the male's antennae, feathered to increase surface area, can be stimulated by single molecules of these highly volatile, species-specific substances.

A male flies into a plume of scent, analogous to a thin veil of smoke floating on the wind. If pheromone is detected, he flies upwind; if the scent is lost he veers left and right until he drifts back into the trail. This means that a signalling female will often attract several males, who continue to arrive even after she is paired – and that's the behaviour you've captured in your photo. **RJ**

## Q Why did my house martins return to the nest after fledging?

Mark Pickin, via email

**A** Once fledged, most young birds do not return to the nest. A hotbed of hungry chicks may attract predators, and it makes sense for the brood to move away

from somewhere that has been the focus of activity for many days.

However, continued use of the nest after fledging is a normal part of house-martin behaviour, with the young returning to roost and receive food for several more days – or, in some cases, weeks. Nests with well-developed chicks are likely to be fairly secure from predators, so the fledglings can use the dwelling as a base while they move towards independence.

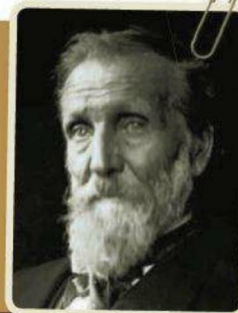
**Mike Toms BTO**



Young house martins fly the nest – but will usually return for a few more feeds.

THE MAN WHO...

## was wild about wilderness – and saving it



**JOHN MUIR (1838-1914)**

**F**or such a small country, Scotland has made a big impact on the world stage. Among its many influential émigrés was the naturalist and early conservationist John Muir, who perhaps contributed more than anyone else to the protection of Earth's great wildernesses.

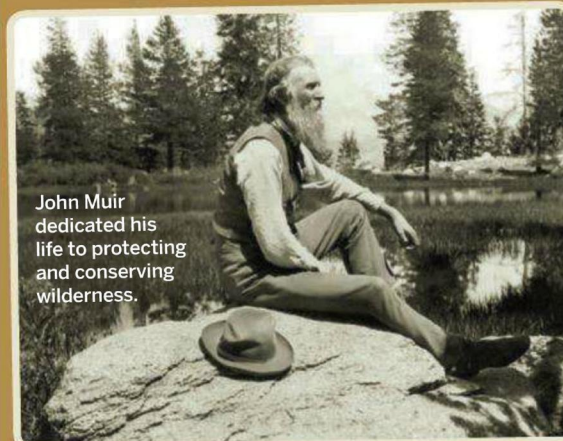
At the age of 10, Muir left Scotland with his family to join a strict Christian sect, called the Disciples of Christ, in the USA. But his own quest for spiritual fulfilment took him in a very different direction when he set off from Indianapolis on a 1,500km walk to the Gulf of Mexico before making his way to California, where he finally settled in the Yosemite Valley in the Sierra Nevada.

"No temple made with hands can compare with Yosemite," he wrote. From his log cabin (which he built himself, and which

incorporated a stream bubbling through the interior), he explored the wilds of California on foot, becoming a self-taught expert in geology and botany as well as an accomplished mountaineer.

Romantic accounts of his adventures captured the American imagination (he had the ear of Theodore Roosevelt, whom he took camping), as did his calls to protect the continent's last great wildernesses. His lobbying led to the creation of the Yosemite, Sequoia and Grand Canyon National Parks, among many others, and the idea caught on worldwide, eventually reaching his country of birth.

Plans are now afoot for a new coast-to-coast walk in Scotland. The proposed John Muir Way would run from Dunbar to Helensburgh, in recognition of his impact on both sides of the Atlantic. **SB**



John Muir dedicated his life to protecting and conserving wilderness.

Top: Corbis; right: Library of Congress/Science Faction/Getty





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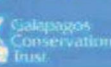


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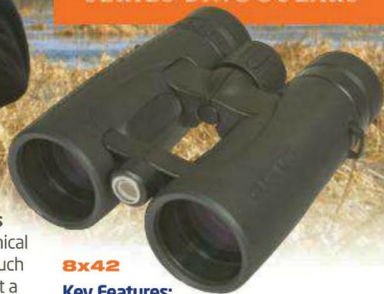
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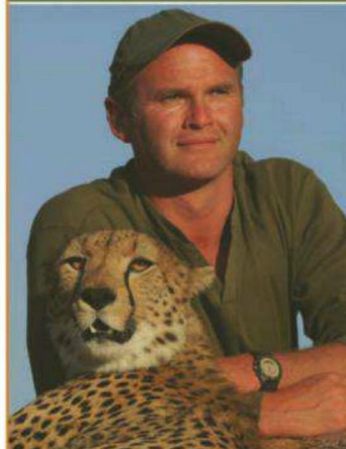
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## THE **BIG** QUESTION

# HOW DOES A CATERPILLAR TURN INTO A BUTTERFLY?

The metamorphosis from furry crawler to winged beauty is nothing short of miraculous - but how is it achieved, and what happens inside that pupa?

### THE EXPERT **RICHARD JONES**



A former president of the British Entomological Society, Richard now works as a surveyor and wildlife writer.



In Britain, some swallowtail butterflies pupate and emerge in the same year, while others overwinter as pupae.



The transformation of stubby, crawling caterpillar into airborne fairy has long fascinated humans: it's the perfect metaphor for change, improvement, escape, even life after death. But at its core is a prosaic and very basic biological urge: the need to eat and grow in safety, then – and only then – to disperse.

The caterpillar is a veritable eating machine – a cylindrical, plant-digesting bag. During the few days or weeks that it is active, it will devour many times its own weight in whatever its chosen foodplant might be. As in all insects, it is the larval stage that does almost all of the eating, and certainly all of the growing. The caterpillar does this quietly and secretively.

In our anthropocentric world, we might expect growth and development to be uniformly incremental – from small (but fully formed) baby to similar (but much larger) adult. Some insects do grow this way – earwigs, plant bugs, cicadas, termites, grasshoppers and cockroaches. Hatchlings resemble miniature adults, with wing-buds gradually increasing until the fully winged adult size is achieved. This is

called hemimetaboly, a seemingly half or partial change.

Holometaboly, a full change, is the complete – and often dramatic – metamorphosis from worm-like larvae to large-winged adults (in entomological jargon, imago or imagines). It's an extremely advanced mechanism, a highly sophisticated chemical suppression of developmental processes. Though only 9 of 26 insect orders are holometabolic, this accounts for 80 per cent of all insects (butterflies, beetles, moths, flies, bees, wasps and ants are majority stakeholders). In short, this is a very successful strategy for growth and development.

## DID YOU KNOW?

The world's largest butterfly, the Queen Alexandra birdwing of New Guinea, produces a chrysalis about 8cm long.

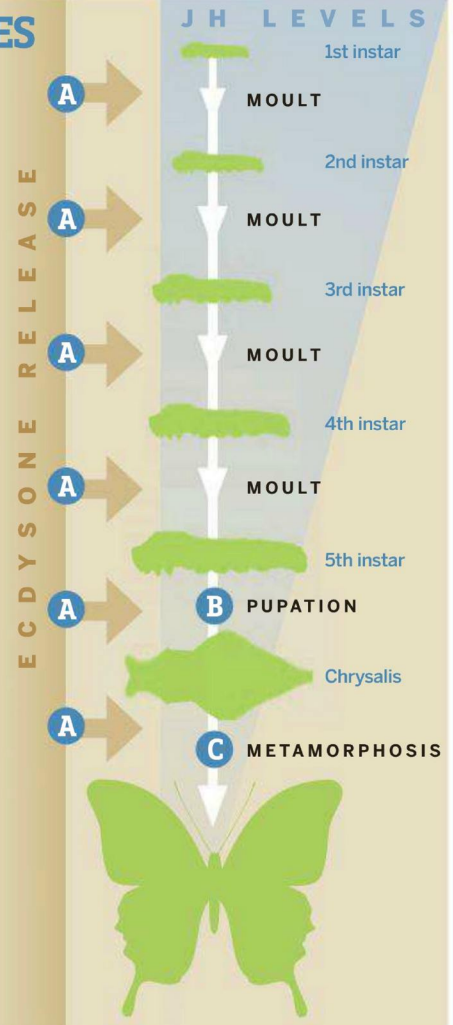
## THE CHILD INSIDE

Even in the smallest caterpillar, just hatched from the minuscule egg, bundles of cells are already primed, destined to become adult features such as antennae, wings, legs and genitalia. Called imaginal discs (being flat and round), they are prevented from growing and developing by a constant wash of a juvenile hormone. As the larva feeds, its gut, muscles and some other internal organs grow and develop, but the imaginal discs are temporarily suppressed and remain dormant. The caterpillar

## SIX DEGREES OF PRE-PUPATION

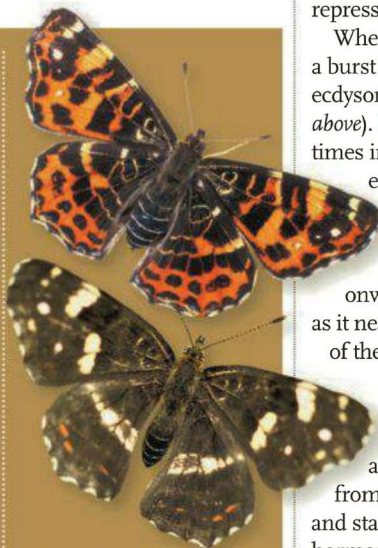
There are usually six metamorphic transformations in the butterfly growth path, each stimulated by a burst of moulting hormone ecdysone (A) from the prothoracic gland. Juvenile hormone (JH), secreted by the corpus allatum gland, slows progress towards adulthood: while levels of JH are high, it keeps the caterpillar a larva. However, JH secretion slows over time; only when it falls below a critical level (B) does a moult result in a chrysalis and pupation.

Now comes a massive redistribution of nutrients, and adult features can finally develop. With JH levels virtually down to zero, the final moult (C) is into an adult.



## SPRING WINGS

The form of a butterfly that emerges from its chrysalis is not always fixed. Environmental factors such as day length and temperature can determine body size, wing pattern and shape. For example, the European map *Araschnia levana* has two strikingly different forms. The larger summer form *prosa*, stimulated as a caterpillar and pupa by long, hot days, is black with a white gash across each wing; but short, cold days in autumn and winter stimulate an early spring form *levana*, whose smaller, delicately scalloped wings are marked orange with a chequered pattern of black spots. In any season, artificially altered temperature and daylight regimes can produce the 'wrong' form.



Temperature affects map butterfly colour – cold days lead to orange, hot to black.

behaves like a free-living, eating, growing but developmentally repressed embryo.

When it reaches a critical size, a burst of moulting hormone, ecdysone, is released (see box, above). It will shed its skin several times in response to ecdysone, each time forming a new instar (stage), but juvenile hormone keeps it a caterpillar, preventing onward development until, as it nears full size, concentrations of the latter hormone decline.

In the fifth and final caterpillar instar, the imaginal discs have already begun to emerge from their enforced dormancy and started to grow. Juvenile hormone now falls below a threshold and the next ecdysone surge stimulates the change into a chrysalis.

The flattened imaginal discs now start to develop unhindered. Each folds into a concave dome, then a sock shape; the centre of each disc is destined to become an extremity – the tip of a leg or the end of a wing. The bulk of the caterpillar's pudgy mass is recycled into the adult features that are meshing together inside the tough shell of the chrysalis.

The interior is, at this stage, mostly a nutrient soup, feeding the embryonic imaginal discs as they complete their delayed development. The last burst of ecdysone occurs amidst almost zero juvenile hormone – and stimulates the emergence of the adult butterfly to mate, disperse and lay its eggs.

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How does Britain's wildlife cope with drought? Send us your big questions for experts to answer – details on p87.



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## LETTER OF THE MONTH

## Conservation lessons from abroad

I recently returned from working in a small, remote town in Namibia. The majority of people there live on a few dollars a day, and many have no running water, sanitation or electricity.

The town is on the migration route of desert-dwelling elephants. Despite their poverty, locals endure with good humour elephants trampling through their vegetable gardens at night. Children in Namibia regularly die from snake bites and scorpion stings. How can we ask less wealthy countries to conserve their wildlife – despite the difficulties it causes – when we're planning a mass cull of one of our few medium-sized mammals (Agenda, May)?

I appreciate that badgers may pose problems for farmers by spreading bovine tuberculosis (bTB), but there are ways, other than culling, of dealing



with the issue, such as vaccination. If we are not prepared to invest in conserving our already pitifully small range of species, do we have any right to comment on what other countries do?

**Barbara Riddick** Newcastle upon Tyne

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\* Please keep your letters short (no more than 150 words). Sorry, but we can't acknowledge them and must reserve the right to edit as necessary

## Free food? Not really...

More than 20 years ago, while living on a low income, I discovered Richard Mabey's book *Food for Free* ('Food for Free at 40', May). It was a revelation. I've since become an enthusiastic vegetable gardener, though I continue to supplement my diet, and that of my five children, with wild plants.

Kirsten's children gather nettles, wood garlic and wild fruits, and know it's not all take, take, take...



But it concerns me that wild food has become 'cool' in recent years, and may soon be another victim of the human tendency to despoil what is precious. I hope that our children's generation will understand how fragile the environment is, and that their survival may depend as much on 'leaving' as on 'taking'.

**Kirsten Freisleben**  
North Pennines

## Let off the hook?

I was alarmed to read your interview with farming minister Jim Paice about badger culling (Agenda, May) and concerned that some sweeping statements he made were printed with no countering argument.

Scientists involved in this issue say that they have no idea why the Government is pursuing a cull. Allowing the minister to make such ill-advised comments in print is very sad.

If the cull goes ahead, none of us will have any right to rail against unregulated oil-palm expansion in Indonesia, the illegal killing of elephants and rhinos or commercial whaling. It is a crazy response to an ill-perceived problem – and deeply, deeply political.

**Amanda Barrett**  
Via email

Your interview with Jim Paice will have done nothing to allay the public's fears about the 'pilot' badger cull. Indeed, the interview read like a Defra press release, and the minister's answers did not address the facts of the issue.

The Government is pushing a wholly political agenda, driven not by science but by the need to appease vocal elements within the farming community. It will cost the lives of thousands of badgers – most of them healthy – with many suffering a lingering death.

Moreover, who will take responsibility when someone is killed or seriously injured as shooters with high-powered rifles are deployed at night in the countryside? How can safety be guaranteed over such large areas?

This reckless and unscientific slaughter of our wildlife will damage tourism and farming, distress residents and have no meaningful impact on bTB levels. Let us hope it is struck down in the courts before it starts.

**Chris Gale**  
Chippenham, Wilts

The May article carrying the ill-informed views of Jim Paice is the final straw. Don't kid yourself that it was journalistic balance – there is no balance in this policy. I won't be renewing my subscription until you remember the name of your magazine.

**Dr Russell Dean**  
Via email



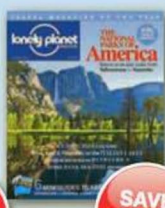
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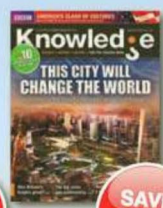
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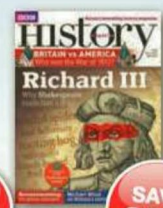
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# WHAT ON EARTH? Amazing wildlife antics from our postbag

 In March, I was walking along the Ogden Point breakwater in Victoria, Vancouver Island, when I noticed a gull in the water. Its head had been trapped by an octopus, and the ensuing battle was primal. In less than a minute, the gull had been drowned and, with only the wings visible, the octopus submerged.

**Ginger Morneau** Victoria, Vancouver Island

The devil in disguise – or an octopus with angel wings?



Ginger Morneau

### BBC Wildlife environment editor James Fair responds:

*Our motive for interviewing Jim Paice was to give him the opportunity to explain and defend a controversial government policy to BBC Wildlife readers (though the responses we have received so far suggest that he failed to convince anyone!). The article also included details of Natural England's advice to ministers, which highlighted serious flaws in their plans. Finally, we have consistently covered other sides of the argument, not least the vaccination issue, which was our cover story in Autumn 2011.*

### What a tease!

We were in Kruger National Park earlier this year when I noticed this black-backed jackal teasing a huge rhino (below right). For half a minute it pretended to attack, dodging the rhino's retaliation, until its victim got very angry and chased the smug jackal out of sight.

**Anthony Nixon**

Via email

### Live and loathed

I've marvelled at BBC natural-history programmes for over 50 years. However, as the word 'Live' came to be tagged onto programme names, the quality and originality started to drop. I first noted it in the final series of *Big Cat Diary*, and the problem continued in *Springwatch* – shots of lorries and the latest electrical kit, youngsters smiling happily or answering texts or tweets.

Now it has reached a new level with *Planet Earth Live*. I like the

two presenters in their traditional roles, but Julia and Richard don't thrill or educate me. Many of the sequences are not live, and feature familiar creatures that are frequently filmed, whereas the footage of the rarely seen aardwolf lasted seconds and wasn't followed up!

I understand that the series is aimed at families. To me, though, it is a dumbing-down of all that was best in BBC natural-history films; it's as though wildlife filming with in-depth narration is no longer enough. Believe me, it is! Let's get back to quality with small, unseen production teams focusing on new subjects, and get rid of the 'Live' epics.

**Jon Isaacs**

Via email

### Saving swifts

The lives of swifts are becoming better understood thanks to new technology ('The swifts are back!', May), but we can all do our bit to help these birds use our houses for nesting. Building

renovations represent the main threat to their future (as well as that of bats), but we *can* improve our houses and still provide the spaces swifts need.

So if you, your neighbours or your friends are carrying out any building work, think about swifts and bats. If you need any help, contact Swift Conservation – [www.swift-conservation.org](http://www.swift-conservation.org)

**Peta Sams**

Ludlow

### Grand old chafer

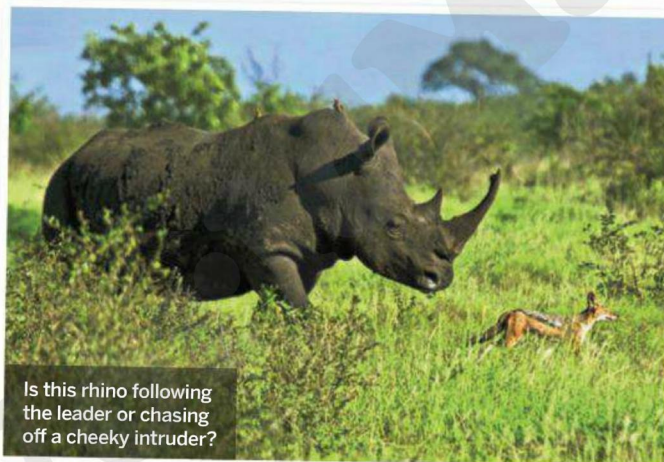
While the etymology of chafer is, indeed, related to the German *käfer* (Wild, May), the Anglo-Saxon word for beetle was *ceafor* (with 'ce' being pronounced as 'ch' in Old English). So the cockchafer has clearly been making an impression on us for over 1,000 years.

**Anne Watson**

London

### Animal stem-cell bank

I was struck by your article about conservationists drawing up



Is this rhino following the leader or chasing off a cheeky intruder?





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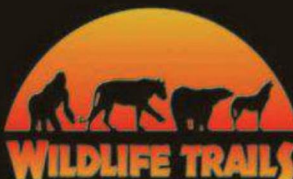


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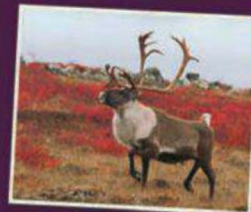
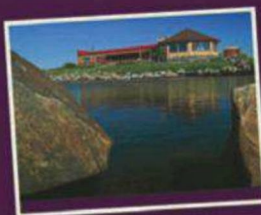
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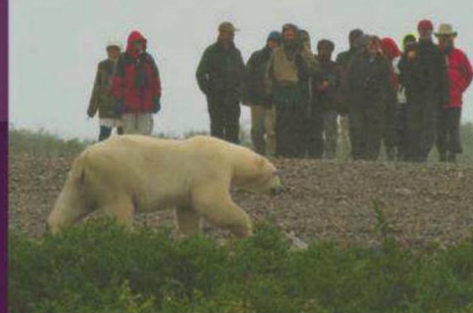


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## From the forum

## China's lost wolves

*Wolf Totem* is an amazing book about the destruction of habitats through human greed and ignorance. Over the past 30 years the wolf has been eradicated from China, where the species had been established for thousands of years. While *BBC Wildlife* recently covered the return of wolves to Europe and North America, Asian ones are not expanding their range in the same way. **deibune**

► [www.discoverwildlife.com/forum](http://www.discoverwildlife.com/forum)

◀ a 'hitlist' of species to save based on financial considerations (Agenda, May). I understand that, in 15 years time, we will have developed cost-effective cloning techniques. My idea is that conservation groups and governments begin an international animal stem-cell bank, initially concentrating only on the most endangered species, but ultimately obtaining samples from every species on the planet. What do other readers think?

**Liv Grant (aged 16)**

Via email

## Selfish snappers

While the ethics of professional wildlife photography are regularly debated in *BBC Wildlife* (Your Letters, June), amateurs can be selfish, too. A trip I went on was ruined by the actions of someone who was determined to get a photograph at any cost. As a result of their behaviour, the animals we were watching moved away.

In my view, staring through a lens at wild creatures is missing the point of the experience. Would banning cameras in reserves be too much to ask? Postcards are almost always available; buying these instead would benefit the local economy while freeing fellow travellers from the constant click, click, clicking. I imagine that the wildlife would approve, too.

**Dawn Thompson**

Via email

## Editor Sophie Stafford says:

*Photography is one way in which many people engage with wildlife, and we don't believe it should be the exclusive preserve of professionals. But we would never encourage the taking of photos at the expense of other people's enjoyment of wildlife – or the welfare of the wildlife itself.*

## Home sweet home

The pair of tawny owls found huddling in the wood-burning stove (Your Letters, May) may have been searching for a nest site. Hole-nesting species such as tawnies and kestrels are finding it increasingly hard to locate natural sites, though they take readily to artificial boxes where there is suitable habitat. There is more information on our website [www.owls.org](http://www.owls.org)

**Millie Clarke**

World Owl Trust

## CORRECTION

The camera-trap photo of a deer on page 61 of our June issue ('Create *Springwatch* in your garden') shows a fallow deer and not, as captioned, a red deer.

## NEXT ISSUE

ON SALE 3 JULY

## BRITAIN'S TOP ANIMAL ATHLETES

If Olympic champions competed against wild animals, who would win?



- \* **RIVER GIANT** Meet Japan's celebrated salamander
- \* **CLOUDED LEOPARD** How to rewild orphan cubs
- \* **MAURITIUS** Saving the island's endemic species
- \* **BRITISH WILDLIFE** A stunning new photo project

**PLUS** Artist of the Year 2012 – our winners revealed

David Telling/spdo-images.com

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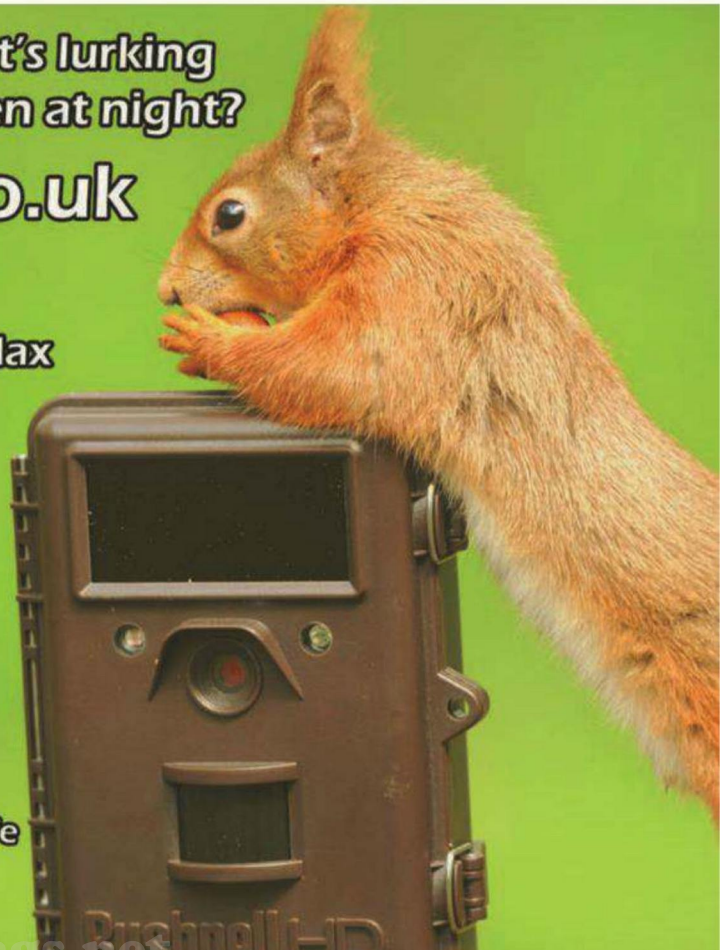
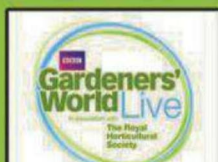


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PHOTO  
OF THE  
MONTH



1

## 1 GOLDEN MOMENT

I spent a whole evening by the side of a river near my home, balanced in a slightly unsteady canoe, waiting for a barn owl to show up. At last it swept in from the far side of the field and began to hunt. I was thrilled to capture the sunlight through its wings – my patience paid off!  
**Elliott Simpson**  
Norfolk

## 2 QUICK EXIT

I took this photo entirely by accident on a day out at Woburn Safari Park, Bedfordshire. Just as I pressed the shutter, the squirrel monkey leaped out of the frame. Still, I was pleased with the way the image captured his motion, colour and texture.  
**Laura Drake**  
Via email



2

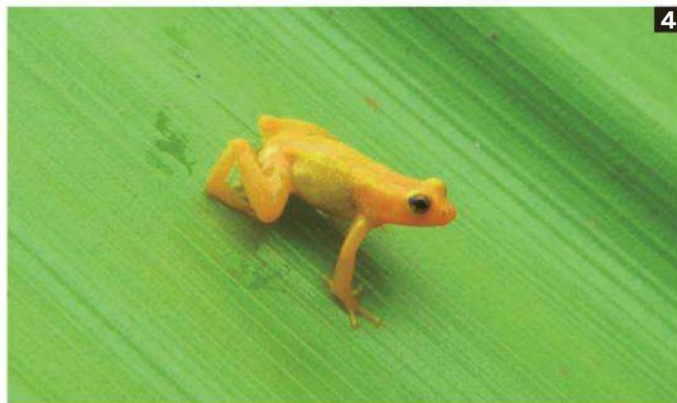
## ▶ WIN, WIN, WIN

The photo of the month wins a pair of Vortex Diamondback 8x32 binoculars, worth £169. Weighing just 505g and measuring 112mm tall, they have a very wide field of view and good close focus. They are fully waterproof and rubber-armoured, argon-gas-filled and covered by the Vortex Unlimited Lifetime Warranty. For details call 01367 242411 or visit [www.newprouk.co.uk](http://www.newprouk.co.uk)



\* Sorry – we can't acknowledge receipt of photos and reserve the right to crop and edit as necessary.





### 3 MOO-VE CLOSER

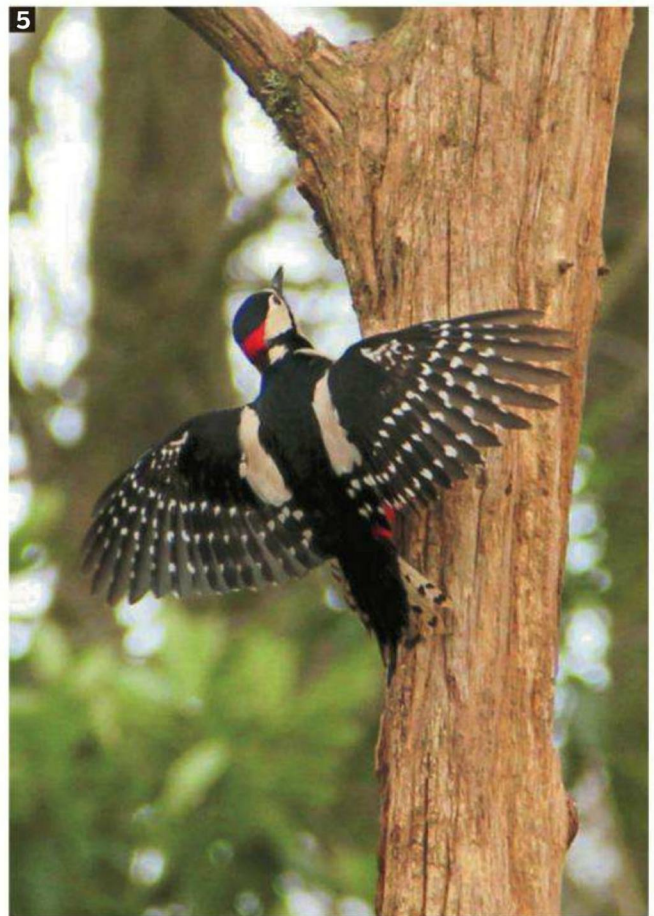
I was photographing a grey-headed kingfisher on a riverbank in Kenya's Samburu National Reserve when a nose appeared in the viewfinder. This curious young buffalo got so close that the bird's beak cast a shadow on its nose.

**Ray Morris**  
Via email

### 4 GOING FOR GOLD

At the edge of Guyana's spectacular Kaieteur Falls we were excited to find this 1.5cm-long golden frog. It lives its whole life in a bromeliad, where a permanent water supply is topped up by spray from the falls. Its poison is used by locals on their hunting darts.

**Elisabeth Cox**  
Teddington, Middlesex



### 5 GREAT SPOT!

I was in a hide at my local nature reserve when this male great spotted woodpecker landed on a tree. Suddenly a magpie started harassing the bird and, startled, he spread his wings to reveal their spots before flying away.

**Madhava Badanahatti**  
Newcastle upon Tyne





6



7



9

#### 6 A WHITER SHADE OF PALE

On Diego Garcia, an atoll in the Indian Ocean, I noticed this fairy tern flying around me. It was obviously protecting its nearby nest. After several attempts I captured this image and was amazed by the feather detail.

**Paul Rickelsford**

Via email



8

#### 7 SQUIRREL NUTKIN

I often see red squirrels here in France, but they are usually too far away and much too quick for a photo – they seem to be more timid than the American greys in England. So I decided to lure them closer with hazelnuts, and I was rewarded with this shot.

**Caroline Boulay**  
France

#### 8 ON A ROLL

Sometimes it's the little things pushing remarkably big things – like this diligent dung beetle in the Maasai Mara, Kenya – that I find most stunning.

**Victoria Young**  
Glasgow

#### 9 MOMENT OF TRUTH

Capercaillie lekking is the highlight of my spring. Last year I visited Norway's best site at the peak of the action, but most of it was taking place much too close to the hide for my 600mm lens. So, instead, I worked on my close composition.

**Odd Larsen**

## PHOTO CONTEST WATER BABIES

The editor's pick from June's online challenge



**FETCH!** by Peter Woods



**PEEK-A-BOO** by Kara Majerus



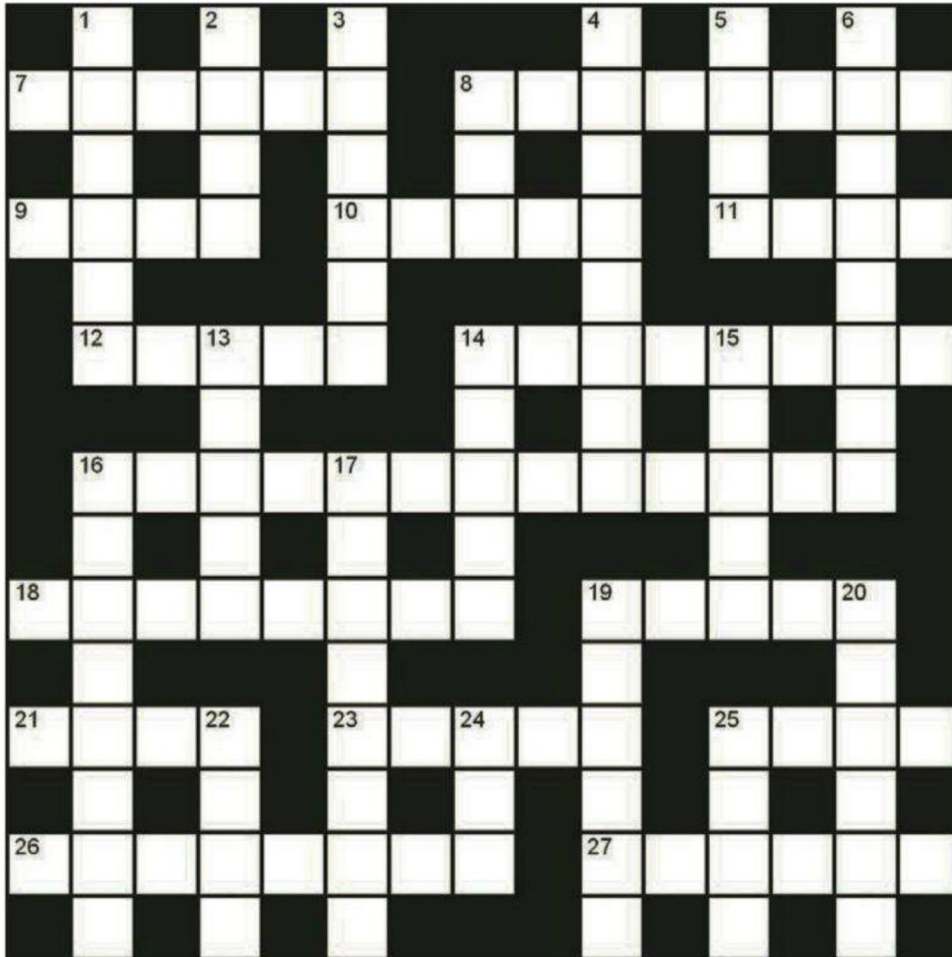
**FLAMINGO** by John Nugent

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## crossword

compiled by EDDIE JAMES



## ACROSS

- 7/25dn** Marine animal of the family Exocoetidae with wing-like pectoral fins, known for soaring leaps (6, 4)  
**8** Rocky Mountain National Park is in this US state (8)  
**9** Another name for wildebeests (4)  
**10** 'Trembling poplar' – tree of the willow family (5)  
**11** Colour of South American morpho butterflies (4)  
**12** Genus of succulent trees and shrubs native to the Americas, with dense brushes of long, thin leaves – popular house plant in Britain (5)  
**14** Aquatic mammal – for example, dolphin or whale (8)  
**16** Rare species of flying mammal (order Chiroptera) restricted, in Britain, to the south (10, 3)  
**18** \_\_\_\_\_ shriek *Lanius senator* breeds in S Europe, Middle East and north-west Africa, and is occasionally seen in the UK. Converse in a copse, perhaps? (8)  
**19** Rare, uncultivated shrubland habitat (5)  
**21** Long-necked bird, like a small cormorant (4)  
**23** Seabird dung used as fertiliser (5)  
**25** \_\_\_\_\_ flies produce a luminous glow, thanks to the action of a luciferin molecule (4)  
**26** Name for aquatic plant in the sedge family – species include sharp, wood and triangular \_\_\_\_\_ (4-4)  
**27** Bivalve mollusc that secretes nacre (6)

## DOWN

- 1** Small, bluntheaded fish with spined pelvic fins – one of several families of perciforms (6)  
**2** Rose fruits (4)  
**3** Large diurnal lizard, mainly herbivorous (6)  
**4** Marine and freshwater drifting organisms (8)  
**5** The hermit \_\_\_\_\_ is a crustacean more closely related to the lobster than its other decapod namesakes (4)  
**6** Common name of two species of large stork of South Asia (8)  
**8** The fly agaric has a bright red, white-spotted \_\_\_\_\_ (3)  
**13** Fern/palm-like plant, little changed since Jurassic (5)  
**14** The Asiatic black bear is also called the moon bear because of the whitish crescent marking on its \_\_\_\_\_ (5)  
**15** Hooded venomous snake of genus *Naja* (5)  
**16** A sperm whale's \_\_\_\_\_ is on the left of its head, rather than on top (8)  
**17** Genus of mosses, commonly called peat moss (8)  
**19** Medium-sized bird of Africa and Eurasia, with curved bill and striking black-fringed orange crest (6)  
**20** Largest type of eusocial wasp (6)  
**22** Desert of Central Asia, home to bactrian camels (4)  
**24** Broadleaf tree with winged fruit 'keys' (3)  
**25** See 7 across

## ANSWERS FROM JUNE 2012 ISSUE

**Across** 1 Bengal 4 Thistle 8 Boar 9 Tusks 11 Game 12 One-horned 13 Tahr 15 Dewlap 16 Tortoise 18 Ranidae 21 Suckle 23 Puma 24 Damsel 26 Barb 27 Hydra 28 Back 29 Alpacas 30 Lenses. **Down** 1 Brown bear 2 Narwhal 3 Arthropods 5 Hiss 6 Saguaro 7 Lemur 10 Scent 14 Grass snake 17 Salt licks 19 Namibia 20 Eland 22 Colobus 23 Pearl 25 Rhea.

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## 108 TRAVEL

### Africa

- Africa Tourist Info
- Busanga Safaris
- Freeman Safaris
- Pure Zanzibar
- Tracks Safaris

### The Americas

- Knight Inlet Grizzly Tours
- Naturetrek
- Orcella Expeditions
- South America Adventure Tours
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- Keells Hotel
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### Europe

- Irish Whale And Dolphin Group
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### UK Travel

- Island Ventures

- Wilderness Cottages

### Worldwide

- Naturetrek
- Whale And Dolphin
- Wildlife Trails

## 112 WILDLIFE PHOTOGRAPHY

- Adriaan Van Heerden
- Derek Gow Consultancy
- Keerok Northshots
- Natures Images
- Wild Dales Photography

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## 113 PRODUCTS

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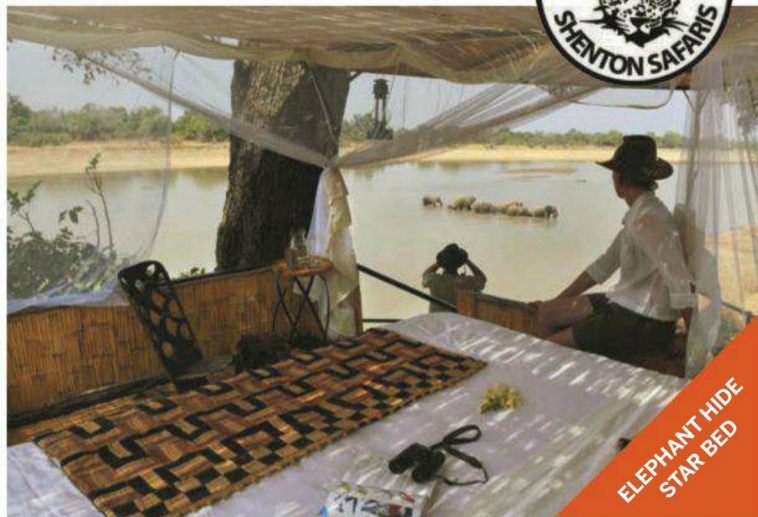
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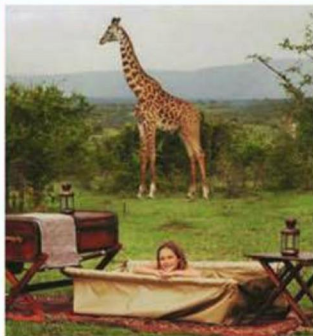
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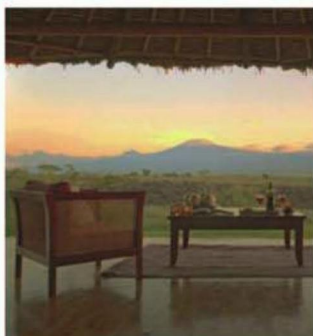
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Email: [Riccardo@sarunicamp.com](mailto:Riccardo@sarunicamp.com)

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# Safari in style: Kenya

From timeless canvas tented camps to luxurious lodges, and from encounters with Maasai warriors to tête-a-têtes with rhinos, Kenya offers a diverse range of unique safari experiences.

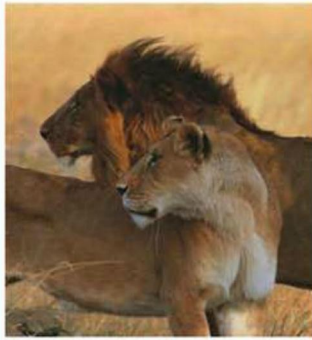


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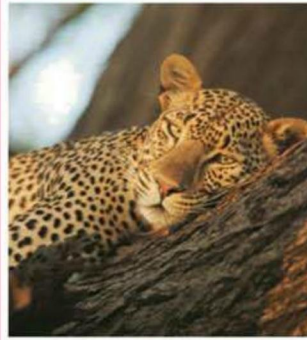
Named after Elsa, the lioness of *Born Free* fame, Elsa's Kopje was once home to George Adamson and his lions, but is now known as one of Africa's most elegant lodges. Elsa's surroundings, Meru National Park, offer the highest diversity of animal species in East Africa, including the Big Five as well as many rare species specific to northern Kenya.



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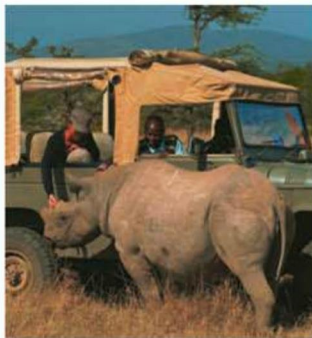
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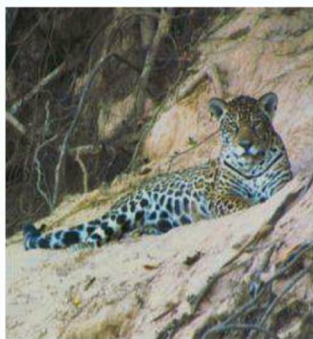
# Safari in style: Around the world

Stylish lodges and camps in Brazil, Kenya, Tanzania, Zambia and Brazil offer opportunities for watching wildlife great and small.



Map is for illustrative purposes only

## 1. EMBIARA LODGE



Embiara Lodge in Brazil's Pantanal is a nature-lover's paradise. The diverse natural habitats surrounding the lodge are home to hyacinth and red and green macaws, giant anteaters, giant otters, tapirs and jaguars. Whether drifting down river by boat, trekking through forests or horse riding around lakes, you are sure to fall in love with this hidden treasure.



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## 2. SAND RIVERS



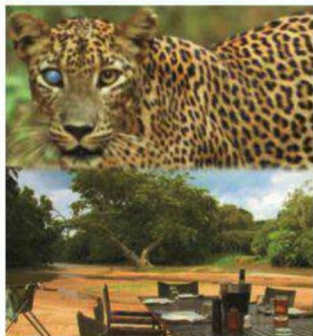
Sand Rivers Selous is set on a sweeping curve of the great Rufiji River in Tanzania. The lodge is both an expedition base and a safari retreat that has been well loved by safari buffs for years. The Selous Game Reserve is a hidden gem, home to a rich abundance of diverse wildlife, and offering a more authentic safari experience away from the higher volumes of tourists.

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[www.puresafari.co.uk/Safari/Hotels/Sand-Rivers](http://www.puresafari.co.uk/Safari/Hotels/Sand-Rivers)

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## 3. LEOPARD SAFARIS SRI LANKA



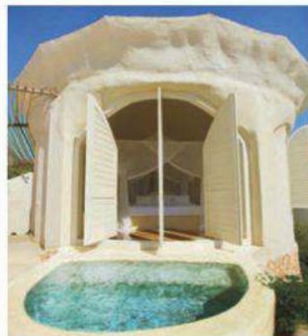
Thirty years tracking Sri Lanka's leopards, combined with a fierce passion for protecting them in the wild, make Leopard Safaris Sri Lanka's number one luxury safari operator. Experience the Sri Lankan wilderness in true comfort; customised South African tents, hot showers and genuine personalised service are just some of the treats that await you.



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## 4. KILINDI RESORT



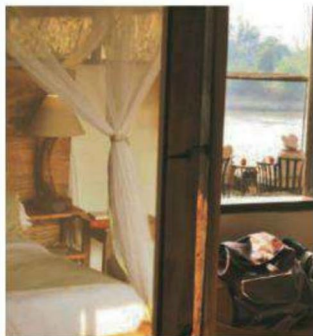
Kilindi Resort is truly a piece of art recently completed along a picture-perfect stretch of beach in Northern Zanzibar. Standing watch over the time-honoured Dhow Routes, along a crescent of coral-bright sand, each of the 15 pavilions embrace cascading rainwater pools, lush tropical gardens and domed private spaces of rest, indulgence and well-being.

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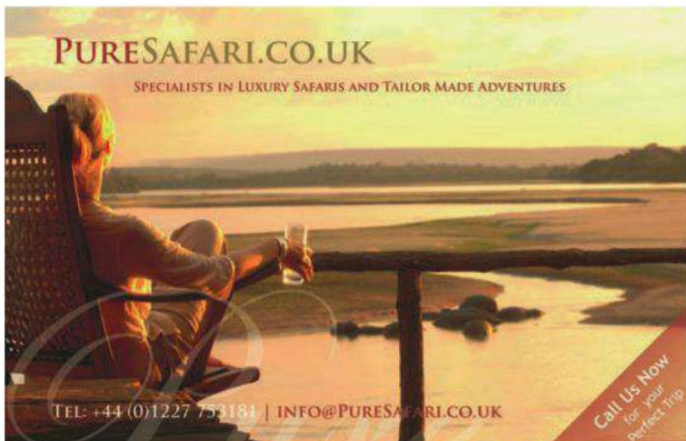
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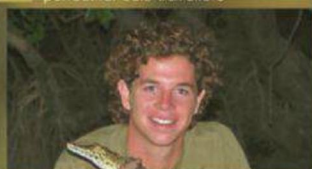
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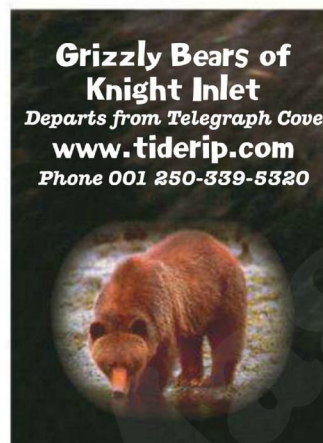
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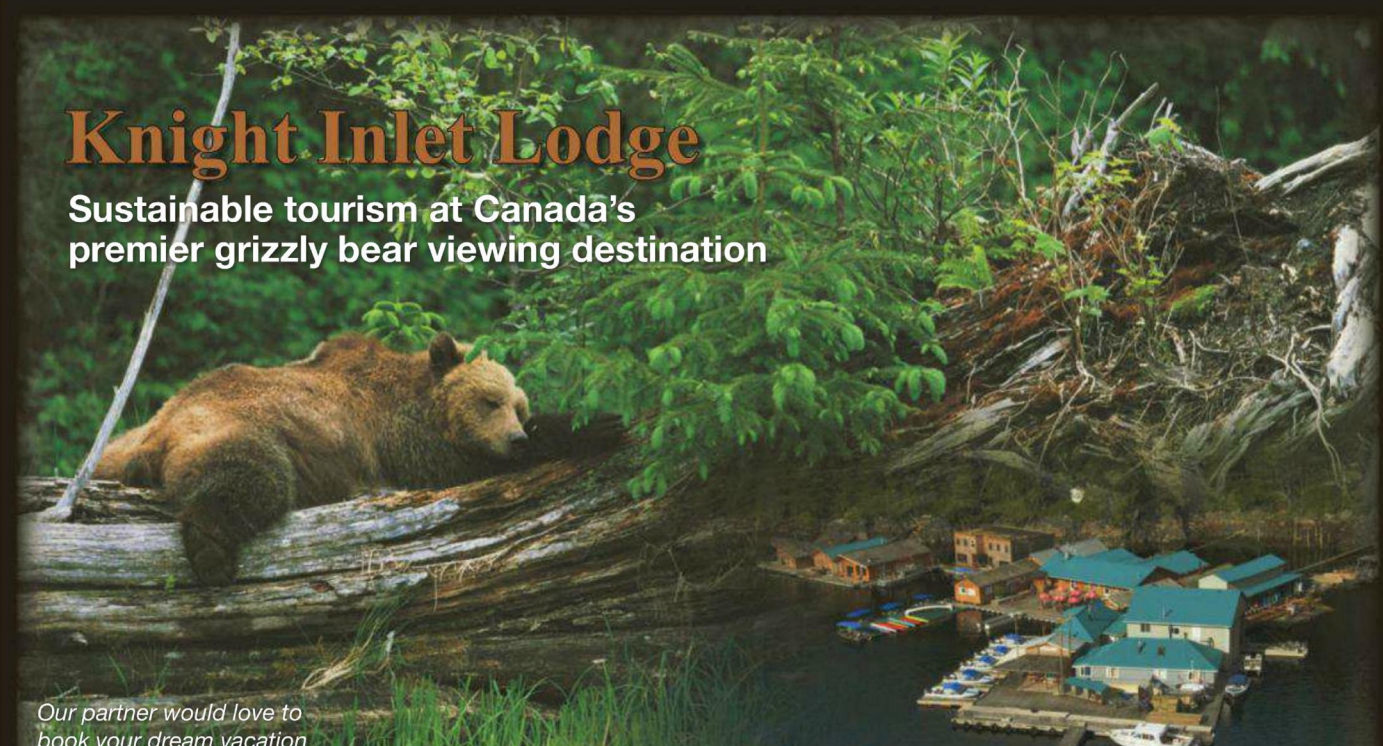
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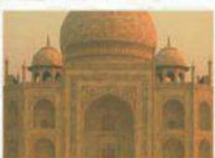

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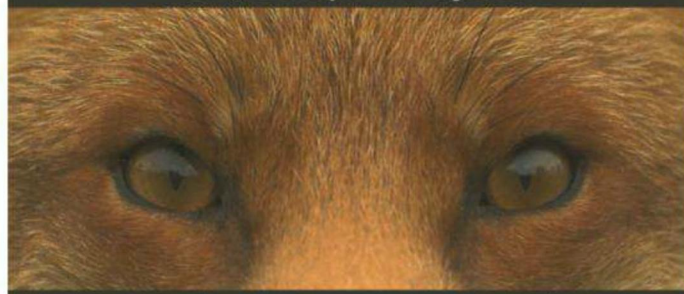
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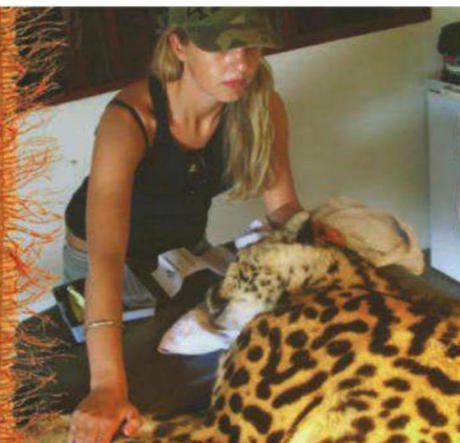




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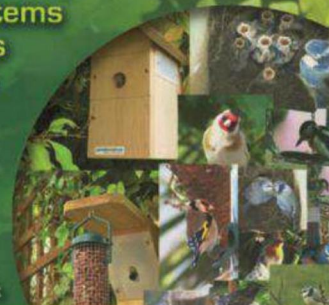
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# TALES

from the

# BUSH

## ILLEGAL ALIENS

The last thing Adam expected to find on an island in his nature reserve was carefully tended 'pot' plants.



NAME Adam Taylor  
PROFESSION Conservationist  
LOCATION Essex, UK

I was a warden at Chafford Gorges Nature Park, in Essex, for two years. Part of my job was to improve the site for wildlife. I built stag beetle 'pyramids', installed reptile and bat hibernacula, and created a raptor nest site by screwing a shopping basket to a tree (it didn't work, but I always thought it was a nifty bit of recycling).

After consulting our bird expert, I decided to encourage common terns to nest by floating a raft on one of the reserve's lakes. I mobilised some volunteers and, after a hot day spent nailing wire to wood, we launched our vessel and paddled out into the lake to position it. It was no *Titanic*, but we still felt proud as the anchor dropped.

### INTO THE UNKNOWN

On the return journey, we decided to explore one of the lake's islands. It covered a couple of hectares and, as far as we knew, hadn't been visited for years. So we were surprised to find a burst rubber dinghy littering the shore. Venturing inland, we came across a discarded flask, food wrappers, spades, forks and empty compost bags. Our 'lost world' had apparently been found.

We pushed our way through silver birch scrub, over the spoilheaps of a former chalkpit and up a ridge. Scrambling over the top, we found ourselves facing 40 neat rows of dark green plants, their slender, palmate leaves hanging like claws in the air. They were unmistakable: cannabis.

I had to hand it to the farmers – they'd done a great job. They had carefully excavated the chalky soil until the water table was at the surface, then filled the trenches with compost. The combination of sunlight and water had

allowed the crop to flourish, and some of the spikes reached almost head-height.

We were impressed and amused, yet slightly riled at the audacity of it. Who would plant cannabis on a nature reserve? Hadn't they heard of the term 'non-native species'?

We called the police, who said they were on their way.

In the meantime, we continued exploring. Being a recent convert to the delights of botany, I took in the plant life. Purple loosestrife and round-leaved wintergreen bloomed in the damp soil, and common spotted orchids and common wayblades flowered in their thousands.

Then I spotted a plant that amazed me. From its leaf arrangement, flowerheads and veining, I knew it had to be a green-flowered helleborine, a rare orchid I'd seen a week earlier at its only known site in Essex. I took some photos and rushed off to show the others before realising that, in my excitement, I'd forgotten about the police. I rang them to follow up, and they asked me to collect evidence (though they probably weren't expecting eight bin bags of cannabis). Back at the office, I emailed my photos of the mystery plant to an expert, who confirmed the identity of my helleborine.

If I kept a diary, the entry would have read: "AM – floated tern raft. PM – busted cannabis farm; discovered new site for rare orchid." Not bad for a day's work. ☒

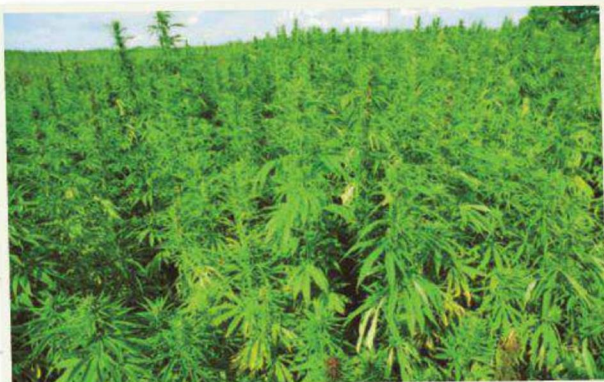
Do you have a tale you would like to share? If so, please email a synopsis of your idea to [james.fair@immediate.co.uk](mailto:james.fair@immediate.co.uk)

**"WHO WOULD PLANT CANNABIS ON A NATURE RESERVE? HADN'T THEY HEARD OF THE TERM 'NON-NATIVE SPECIES'?"**



**ABOVE**  
Floats your boat: the team built a raft to attract nesting terns to Chafford Gorges.

**BELOW LEFT**  
High life: people can and do grow cannabis almost anywhere – even on a tiny island in the middle of a nature reserve.



Tern raft: Adam Taylor; cannabis: David Hoffman/Alamy



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