The Rehabilitator

Spring 2022

ISSUE 82

+ BWRC NEWSLETTER+

Our New Website Goes live!

Also in This Issue:

- Post release monitoring: Why bother?
- An alternative to captive rearing hirundines
- Vitamin B deficiency and swifts

HART Wildlife Rescue

Pneumothorax case study in a red fox
Courtesy of HART Wildlife Rescue

The Rehabilitator

+ BWRC NEWSLETTER+

Contents

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ISSUE 82

Word From the Chair

Welcome to the spring 2022 edition of The Rehabilitator from all the team at the British Wildlife Rehabilitation Council. The BWRC is very sad to announce that Terri Amory has stepped down from her role as the Chairperson of BWRC. The Trustees and I wish to thank Terri for all of her hard work, commitment and leadership over the years; and I know I echo many voices in saying that she will be sorely missed. Included in this edition is a tribute and overview of the work that Terri has contributed to the BWRC over many years, and I am grateful for Janet Peto for preparing this celebration of her work.

I have since been nominated for, and accepted the role of Chairperson and very much look forward to working with you all over the coming years. As I am new to the role, I thought it might be useful to provide a short introduction about myself for members. I have been a trustee of the BWRC for several years, and am an Associate Professor at Swansea University. My background is focused around British wildlife ecology and conservation and a research interest in several infectious and zoonotic diseases. I am also actively involved in wildlife welfare and ethics in science, and have a passion for Equality, Diversity and Inclusivity in science and nature conservation. I am extremely keen to hear your views on any aspect of wildlife rehabilitation so please do get in touch if you have any questions, queries, ideas or concerns that you wish to raise with us; we are here to support you. Write to BWRC at admin@bwrc.org.uk or by post to PO Box 8686, Grantham, Lincolnshire NG31 0AG.

The Spring edition of the Rehabilitator includes a range of fascinating articles on a diverse number of topics including bird ringing, vitamin deficiency in Swifts, and post release monitoring. As always, we are grateful for the contributors for their time and expertise, and we welcome letters, ideas and submissions for future editions of The Rehabilitator. It is also with great pleasure to announce that the BWRC has a new website (https://www.bwrc.org.uk/). I would like to thank the Trustees, and Simon Allen in particular, for their hard work. The new site is very user friendly and useful and we will continue to build and add to it over the years. Do let us know what you think!

As we move through this year, the BWRC will be establishing a range of new working groups that will begin to focus on different core aspects of our work. We are pleased to welcome Dr Liz Mullineaux and Paul Reynolds to the first of these new working groups. We very much hope to create more opportunities for members to become actively involved with the BWRC over the coming months. Watch this space!

Take care of yourselves as we head into the busy season,

Very best wishes,

Dan

Thank You Terri

It is with a heavy heart that the BWRC saw their Chair of almost a decade stand down in January this year. Terri Amory made the big decision to take a step back from the charity for personal reasons and will be sorely missed by trustees and members alike.

Terri first joined the BWRC in November 2004, after being invited by Ray, when taking a group of Reaseheath College students on a class trip to Lower Moss Wood. She was an active trustee for the charity for nine years before being elected Vice Chair in February 2013 and Chair shortly after, in January 2014.

During her eighteen years at the BWRC, Terri made some fundamental changes to the charity. She worked with fellow trustee (Janet Peto) and a local solicitor to change the BWRC from a charitable trust to a CIO, meaning the charity could have active members for the first time. More recently in 2019, she set up the charity's organisational membership option, meaning an entire wildlife centre could join the BWRC as one unit.

Whilst Terri was with the BWRC, she also achieved many personal goals. Terri is married, has two daughters and a poodle dog. The family love football and trustees were informed never to phone when there was a big England match on (as Janet once did)! Terri was secretary to the Sherriff in her local area for many years. She also now holds a black belt, along with the rest of her family. Trustees are unsure whether she got this to manage the students where she works at Writtle University College… Although, Terri still denies this!

Alongside Chairing the BWRC, Terri taught (and still teaches) "Jazzees" which is a Jazz dance exercise class. She also volunteers for her local Wildlife Trust, to help look after her local nature reserve.

It is evident from all that Terri has done and is still doing, that she is passionate about wildlife and people alike. The BWRC cannot thank Terri enough for all she has done for the charity, and the trustees wish her all the best in everything she is doing going forward. She was a fantastic Chair and hopefully she will be back one day!

We wish you all the best

A Short Tail from HART

Written by: Paul Reynolds, BSc (Hons), MSc Hospital Manager HART Wildlife Rescue

HART Wildlife Rescue were called about a fox behaving strangely in a member of the publics garden in Fleet, Hampshire on 06/03/2022. The hospital manager Paul Reynolds and a volunteer attended the address and found a fox who was behaving subdued, with a partial infected amputation of the tail, a puncture on the muzzle and an abnormal respiration rate. The fox was easily caught and wasn't putting up any resistance, even when handled.

Photo courtesy HART Wildlife Rescue. Taken by the caller before they arrived.

It was clear that the fox needed immediate veterinary intervention and we rushed to an emergency appointment with our vet. The fox was very thin, weighing 4.5kg and was displaying worrying signs of a pneumothorax. X-rays confirmed that the pneumothorax was present on the left side and the fox went into emergency surgery. 300ml of air was removed from the chest cavity and the lung reinflated. The tail amputation site was also debrided, cleaned, and repaired.

Initial xray showing pneumothorax

Xray post-surgery with the lung reinflated

The next 48 hours were going to be key to as to whether the fox was going to recover from what had been a very traumatic incident. We suspect it had all started with him being hit by a car originally. Remarkably the fox recovered fully from the surgery and the tail began to heal, however, a couple of days after pain relief was stopped the fox began to lick the tail wound site causing it to become open and weeping again. Our vet recommended to start a new course of pain relief and the fox ceased licking the wound site and so the tail healed properly.

For the first 1.5 weeks we were concerned that the fox appeared overly tame, he wasn't afraid of us and appeared relaxed when we entered the enclosure. Thankfully as time went on and he began to heal, so did his behaviour and 4 weeks later we had a very wild fox weighing in at 6.5kg who was ready to be released back to where he was found. From a weak and subdued fox who was easily caught and handled we now had a wild fox desperate to be free, upon opening his crate he shot out in the direction that he clearly knew well and disappeared off back into the wild.

HART Wildlife Rescue is a UK registered charity (#1066760) operating a wildlife hospital in Alton, North East Hampshire, providing a rescue, treatment and rehabilitation service for wildlife from all over Hampshire and surrounding counties. HART also gives professional advice to vets, the RSPCA and members of the public from all over the country, as well as providing talks and work experience opportunities for students.

HART Wildlife Rescue

BRITISH WILDLIFE REHABILITATION COUNCIL

Post Release monitoring: Why Bother?

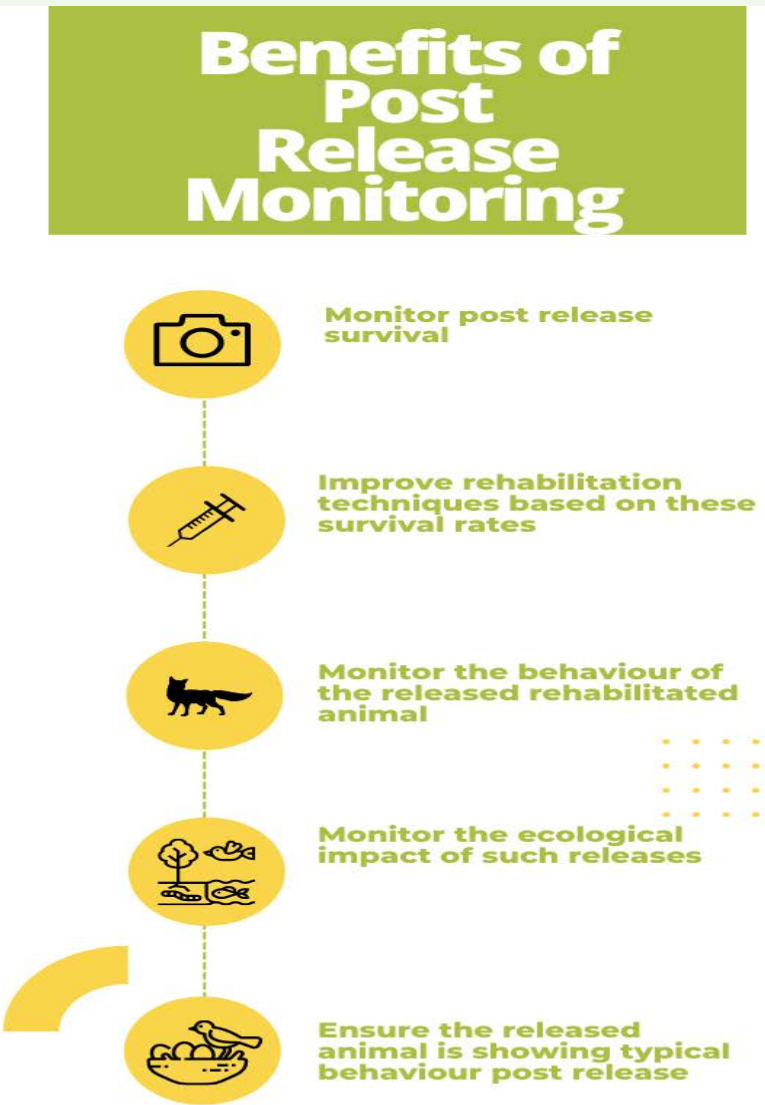
Written by: Chris Riddington Trustee BWRC

The first badger cub comes through your doors. The hard work begins, sleepless nights, regular feeds, TB testing, all this hard work to get this little cub ready for release. The big day comes, and all that hard work has paid off……. or has it?

It seems like a simple question, was the rehabilitation or hand rearing a success? It went back to the wild, it must have been, but what happened later that day, that week that month? How do we know if it truly was a success? How do we know if all that hard work paid off without post release monitoring?

Which brings us back to the question, why should we bother?

Post release monitoring is crucial and essential for many reasons in wildlife rehabilitation.



It does not have to be expensive! Microchipping can be a useful tool for post release monitoring (with veterinary guidance). Used widely, with success, in hedgehogs, foxes and badgers, but note that you will need a licence to mark badgers. Data from these microchips have proved of benefit when microchipped hedgehogs have been found or have come back into care some years later. Useful data can be gleaned, such as how far have they travelled for from their release site, survival post release and the success of the rehabilitation process.

Camera traps are another simple yet effective way of post release monitoring, again inexpensive, these traps are an ideal way to monitor post release behavior.

Ringing (alongside a BTO ringer) is also a very cheap and easy way of long-term post release monitoring, but this does rely on rings being reported. If a rescue admits a ringed bird its essential it is reported to the BTO or on the Euring website for this reason.

REPORT YOUR RINGED BIRD HERE:

https://app.bto.org/euring/lang/pages/rings.jsp

Whilst post release monitoring should be seen as an essential part of rehabilitation, it is important to ensure that laws and legislations surrounding wildlife is followed. Certain methods of post release monitoring will need training and/or a licence such as bird ringing, tattoos, tags, bird marking etc.

With many online stores making monitoring accessible and affordable, as rehabilitators we have a responsibility to monitor the impact we have on the individual animals we release and the ecosystem that we release them in to. Without this crucial information then we can never truly know that what can be deemed as a success. We need to learn what works, but also more importantly what does not.

The question should not be why bother, post release monitoring is as important as the rescue, the rehabilitation and the release

Further Reading and Information:

- www.britishhedgehogs.org.uk/monitoring-rehabilitated-hedgehogs/
- BSAVA Manual of Wildlife casualties second edition
- https://www.zsl.org/conservation/how-we-work/conservation-technology/low-cost-wildlife-tracking-devices
- https://www.rspca.org.uk/whatwedo/care/release/postrelease
- https://www.nhbs.com

BRITISH WILDLIFE REHABILITATION COUNCIL

Avian Influenza

Written by: Simon Allen BWRC Vice chair

For avian influenza virus classification and explanation of HPAI and LPAI please see appendix.

A brief history of avian influenza

Birds are the primordial reservoir of all influenza viruses for avian and mammalian species (the origin of bat influenza viruses is still uncertain), all influenza A subtypes circulate in wild bird populations; birds are the natural reservoir for these viruses (1), see **fig.1** for host range. Most **A subtypes** in wild birds are low pathogenic avian influenza (LPAI) type viruses and are avirulent or cause asymptomatic infection, that is they rarely cause disease or produce clinical signs. LPAI viruses are commonly isolated from wild birds, particularly Anseriformes which include swans, ducks and geese and Charadriiformes which include shorebirds such as waders, gulls and also the pelagic family auk (2).

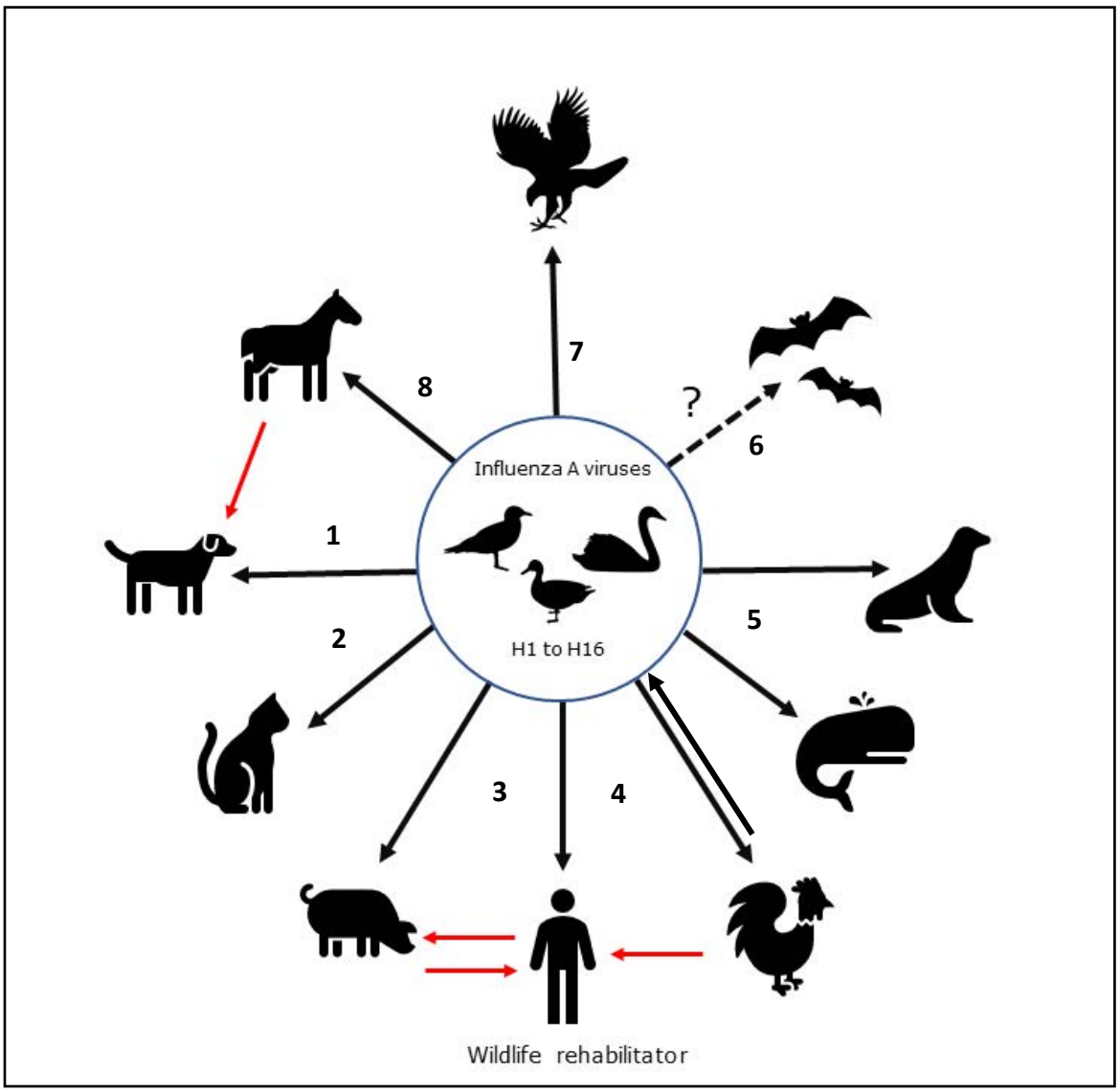
It is generally accepted that **highly pathogenic avian influenza (HPAI) viruses emerge from LPAI viruses** that have been allowed to circulate within poultry† where they can mutate into the highly pathogenic form, causing mass mortality and economic loss within the commercial poultry industry (3–6), So far only subtypes **H5 and H7** have caused epizootics (an epidemic in animals), although not all H5 and H7 viruses cause HPAI (7).

These HPAI viruses can **spill over** into wild bird populations, having previously been isolated in dead wild birds near outbreaks in domestic poultry premises (4,7,8). The first accepted recorded case of HPAI was in northern Italy in 1878, it used to be known as “foul plague” and people did not recognise it as a virus (9). It was not until the early 20th Century that it was identified as a virus (4). Since then it has been discovered globally and hundreds of millions of poultry have either been culled or have died because of outbreaks.

For a time, scientists believed that HPAI viruses were only regularly found in poultry and that they could not be maintained in the wild bird population. They thought the spread of the virus was still primarily through movement of infected poultry or poultry products (10), such was the case of the H5N1 outbreak in England in January 2007 that was traced back to imported turkey meat from Hungary (11). **This all changed in May 2005** when an outbreak of highly pathogenic H5N1 in waterfowl at Qinghai Lake in western China, which killed over a thousand migratory birds with no outbreaks of HPAI in nearby poultry (12). The virus was traced back to previous outbreaks in Hong Kong in 1997 (13). The lake being an important breeding and overwintering location for **migratory birds** from Tibet, India, Southeast Asia, Siberia, Australia, and New Zealand, signalled its eventual spread into Europe via migrating bird populations.

†For clarity the term ‘poultry’ typically is defined as domesticated birds that are kept for their food, feathers, or sport and include several orders of birds.

The list of poultry species is large, but can include ducks, chickens, turkeys, quail, pheasant, and pigeons. **Gallinaceous** poultry which are heavy bodied, largely ground-feeding domestic or game birds that include chickens, pheasant, turkeys, grouse, partridges, and quail, are most affected by HPAI viruses.



- **Fig.1** Adapted from Manz *et al* (14) 2013 **1)** Racing greyhounds in North America contracted **H3N8** equine influenza virus (15,16). **2)** Dogs, Cats, Tigers and Leopards contracted **H5N1** from eating or being fed infected meat (17–19). **3)** Pigs have been considered to represent a potential "mixing vessel" in which reassortment between human and avian influenza viruses could occur (20), **H1N1**, **H3N2** and **H1N2** are found in pigs globally (21). **4)** Whenever avian influenza viruses are circulating in poultry, there is always a risk of human infection. **5)** Hauled out Seals and Whales sharing the same coastline and coastal waters have contracted **H5N8, H7N7**, **H4N5**, **H4N6**, **H3N8**, **H3N3, H10N7** and **H13N2**, **H13N9** respectively (22–24). **6)** Research is ongoing to discover the origin of bat avian influenza viruses.
- **7)** Birds of prey contract avian influenza from eating infected quarry or carrion. **8) H7N7** and **H3N8** Equine Influenza is highly contagious amongst horses, Donkeys, Mules, and other equidae - domestic and wild. **H5N1** has been associated with an outbreak of respiratory disease in Donkeys in Egypt (25)

Avian influenza in people

Worldwide **human seasonal influenza** epidemics are estimated to result in about 3 to 5 million cases of severe illness, and an average of 389,000 deaths every year in the most vulnerable of the global population (26).

From January 2003 to 3rd February 2022, there have been 863 cases of human infection with **avian influenza A H5N1** virus reported from 18 countries. Of these 863 cases, 455 were fatal (case fatality rate of 53%) (27).

There have been two cases of avian influenza in humans in the UK. The first was a 43-year-old woman with conjunctivitis who caught **H7N7** from her pet ducks. The virus was closely related to an H7N7 virus isolated from turkeys in Ireland in 1995 (28). The most recent case was a 79-year-old man from Devon, South West England who caught the infection from his domestic ducks. The ducks tested positively for HPAI A **H5N1** by the United Kingdom National Reference Laboratory at the Animal and Plant Health Agency (APHA) Weybridge. The gentleman showed no signs of illness but an upper respiratory swab was taken from him on 24th December 2021 which tested positive for influenza A with subtyping **H5**, the virus has yet to be fully subtyped and analyses are ongoing at the time of writing (29).

These viruses are not well adapted to new hosts, including people and replicate and transmit poorly, meaning that people are "dead end" hosts for these viruses, that is, in most cases there is no subsequent human-to-human transmission. However rare cases of human-to-human transmission have been reported in closely related family members, although this is still rare and sustained human to human transmission has not been maintained (30,31).

Avian influenza in birds

Primary transmission

Depending on the type of avian influenza virus and the species of bird infected, the viruses replicate primarily in the **intestinal tract** facilitating virus spread via the **faecal oral route** (32), this means the virus is shed in the faeces and infection occurs through ingestion of faecal material or drinking water contaminated with faeces. HPAI viruses can infect many internal organs including the brain and the upper **respiratory tract** shedding the virus in **oropharyngeal secretions** which in turn can contaminate drinking water and may also be transmitted in aerosols (**airborne transmission**) (33,34). It is important to note that chronically infected birds especially **waterfowl may excrete virus particles for periods longer than 30 days**, which exceed the minimum **quarantine period,** which is typically 14 days (35) .

Secondary transmission

The most likely cause for the spread of avian influenza viruses in captive birds between facilities and premises is by mechanical transfer of infected faeces or body fluids via people and fomites - a fomite is any inanimate object (non-living object) or material that is likely to carry infection (7). Staff may spread the viruses on dirty hands, equipment, clothes and footwear, which in turn could contaminate floors, door handles etc, it's also possible that vehicles may become contaminated facilitating the spread to separate premises along with any people and equipment moved between premises or facilities.

Persistence of avian Influenza in the environment

H5N1 can potentially remain infective in faeces for up to **eight weeks** given the right conditions of humidity and temperature (36).

H5N1 HPAI viruses given the right conditions have been reported to persist in water for over **60 days** and other **influenza A** viruses up to **102 days** depending on temperature and the type of water (37,38). It has been postulated that some influenza viruses can remain infective for longer in frozen water and potentially overwinter in lakes, re-infecting returning migratory waterfowl (7,38–40).

What does all this mean for the wildlife rehabilitator?

Legal aspects

Avian influenza is a notifiable disease listed under schedule 2A of the Animal Health Act 1981. As a wildlife rehabilitator any birds with suspected avian influenza must be euthanised and reported - this is a legal requirement and failure to do so is an offence:

- In England contact DEFRA Rural Services Helpline on 03000 200 301.
- In Wales, contact 0300 303 8268.
- In Scotland, contact the local Field Services Office.
- In Northern Ireland contact the DAERA Helpline on 0300 200 7840 or your local DAERA Direct Regional Office.

Once a **wild bird** is admitted to your centre DEFRA will treat this as a **captive bird** and your centre will become a **premises** under the legal definition within the Animal Health Act 1981 and with that comes **powers of entry** and **slaughter**. If a bird in your centre tests positive for bird flu and your biosecurity is not robust enough, DEFRA will cull all the birds on your premises with the rare exception of some red listed species on the International Union for Conservation of Nature's Red List (IUCN). Even then, these birds will be unable to remain where they are and will have to be moved to an isolation facility on your premises, there will also be follow up tests on these birds in case they are incubating the virus.

To mitigate against this, assess **higher risk species** (see table 1) outside your premises and euthanase any birds with suspicious symptoms there. This may not be possible for all centres, where the only real alternative to mitigate against bird flu entering your premises is not to admit higher risk species. Please be aware that **any bird** can potentially be infected and table 1 is only a guide to decision making. The euthanised bird(s) should then be double bagged and labelled until further instruction after reporting the bird(s). DEFRA will then treat this as a wild bird submission which does not invoke the legal protocol under the Animal Health Act. The BWRC (with its stakeholder members) are working with DEFRA on developing a workable solution and hopefully they will produce clear definitions and guidance in the near future.

Wildlife rehabilitators are advised to sign up to the APHA's Animal Disease alert subscription service to receive immediate notification of new cases and updated zones.

You can check where disease control **zones** are located in the UK and if you are in a zone on the Animal and Plant Health Agency (APHA), and in Northern Ireland on DEFRAS interactive map.

Avian influenza zones

An **Avian Influenza Prevention Zone** (AIPZ) means that it is a legal requirement for all bird keepers in that zone to keep their birds indoors and follow strict biosecurity measures to limit the spread of and eradicate the disease. If you have wild birds in rehabilitation in outdoor enclosures, steps should be taken to minimise contact with local wild birds and their faeces. For instance, keeping food and water provisions under-cover in outside enclosures to prevent contamination.

Separate AIPZ declarations are made in each UK administration. For further details see:

England - see the Gov.uk website

Scotland - see the Scottish Government website

Wales - see the Welsh Government website

Northern Ireland - see the DAERA website

Temporary Control Zones

Temporary control zones are declared when avian influenza has been confirmed but further tests are ongoing to determine the pathogenicity of the strain.

Once testing is complete other types of zone are enforced. Depending on the type of zone you are in will affect movement and release of certain birds and mammals from your centre. There are general licences available, for details on licences for movements from disease control zones in force, see the licensing section. DEFRA have launched a new avian influenza licensing service this is a two-stage process, you need to register and then apply for a licence. DEFRA acknowledge that the wording of these licences are not necessarily clear and applicable to wildlife rehabilitation as they are primarily intended for the farming industry, their licensing team are aware of this and will develop the wording accordingly as time goes on.

Health and safety considerations

Avian influenza is a zoonotic disease - it can be transmitted from a non-human animal, usually a vertebrate to a human and can also occur in reverse. According to the UK Health and Safety Executive the most likely route of human infection will be by breathing in dust and mist generated by infected birds and by not washing hands after handling infected birds or contaminated equipment and clothing, see Persistence of avian Influenza in the environment and Secondary transmission above. DEFRA consider avian influenza an occupational health risk for anyone working with birds. Appropriate PPE for dealing with suspected or unknown disease status birds should include FFP3 masks (or full-face respirators), coveralls, safety goggles, rubber/polyurethane boots (or disposable shoe covers) and disposable nitrile/vinyl/heavy duty rubber (not latex) gloves. Face masks should be fit tested.

Care should be taken when removing and disposing of or cleaning PPE and hands washed well afterwards. Appropriate disinfectants should be used. Here is a list of Government approved disinfects for avian influenza.

Clinical signs in birds

Clinical signs of HPAI can vary according to species of bird, individual immunity and concurrent disease; some may show minimal or no clinical signs but may include any or a combination of the following:

- sudden and rapid increase in the number of birds found dead
- several birds affected in the same enclosure or air space
- swollen head
- closed and excessively watery eyes
- lethargy and depression
- recumbency and unresponsiveness
- incoordination and loss of balance
- head and body tremoring
- drooping of the wings and/or dragging of legs
- twisting of the head and neck
- haemorrhages on shanks of the legs and under the skin of the neck
- loss of appetite or marked decrease in feed consumption
- sudden increase or decrease in water consumption
- respiratory distress such as gaping, sneezing, gurgling or rattling
- fever or noticeable increase in body temperature
- discoloured or loose watery droppings

Biosecurity guidance

DEFRA and the devolved Governments have not published specific wildlife rehabilitator guidance at the time of writing, although good biosecurity is essential in the day to day running of your centre and is something you need to develop with your vet or referring practice.

It is recommended that you contact DEFRA (on the numbers above) to arrange a visit to your centre or premises to discuss your biosecurity arrangements to ensure a level that you can operate at safely without risking your inpatients. The more wildlife rehabilitators that do this the more likely DEFRA will recognise the numbers, diversity and the scale of the issue within the wildlife rehabilitation sector.

Please email the BWRC and let us know of your concerns about avian influenza and your experience after contacting DEFRA.

There is published biosecurity guidance aimed at farmers and domestic bird keepers where relevant sections also apply to wildlife centres, along with the latest information on the avian influenza situation:

- England: https://www.gov.uk/guidance/avian-influenza-bird-flu
- Scotland: www.gov.scot/avianinfluenza
- Wales: https://gov.wales/avian-influenza-bird-flu
- Northern Ireland: https://www.daera-ni.gov.uk/articles/avian-influenza-ai

There are also a series of webinars available on the Government website, although aimed at the poultry industry, vets and backyard poultry keepers, the generic advice may help in developing your biosecurity strategy:

DEFRA, Welsh Government and Scottish Government have published specific biosecurity guidance relating to managing the more challenging bird species, such as ostriches, ducks and geese, where welfare can be compromised by inappropriate emergency housing. Please refer to this specific guidance for further advice.

Isolation

- According to a member of DEFRA's exotic and endemic disease control team - foot dips and disposable coveralls and separate isolation areas are not sufficient biosecurity. Every centre will need all the above and **separate staff** that deal only with the birds in isolation and also held in a **separate premises** for a minimum of two weeks. This can be regarded as a gold standard and probably not obtainable for the vast majority of rescue organisations, and although this gold standard may be impossible to achieve for most, good biosecurity will limit the damage caused by HPAI if found in your centre, but cannot guarantee that all your avian inpatients will not to be culled if your biosecurity is weak. See fig.2 for an actual case of highly pathogenic avian influenza A **H5N8** virus at a wildlife centre in England 2020 where there was a separate isolation unit employed, holding multiple species and staff attending to various inpatients.

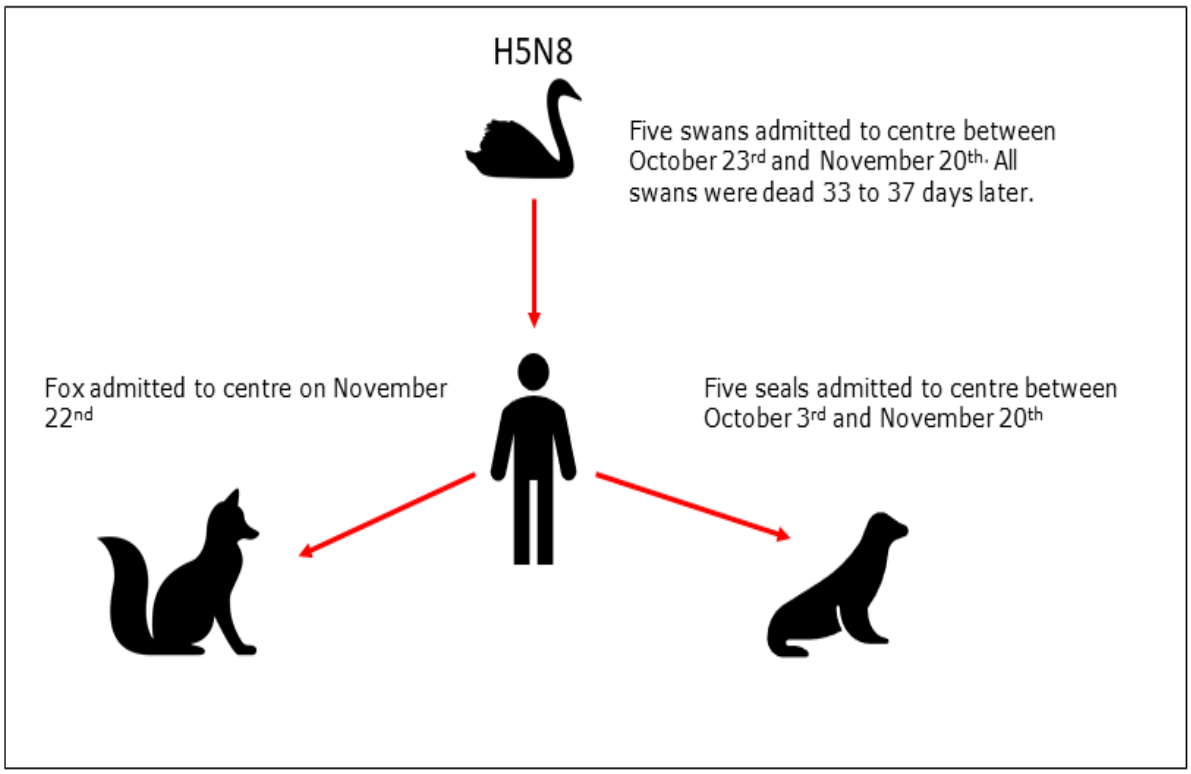


Fig.2 The fox (*Vulpes Vulpes*) died suddenly after a short period of depression and inappetence (not eating). The seals (four *Phoca vitulina* and one *Halichoerus grypus*) exhibited sudden onset neurologic signs, including seizures before dying or being euthanased. This mortality event occurred approximately 1 week after the deaths or euthanasia of five mute swans (*Cygnus olor*) held in isolation at the center because of acute-onset malaise and terminal seizures.

Table 1. This table is a collection of species tested globally for avian influenza viruses from many separate studies spanning 1972 to 2004 from as far as America, Europe, Asia, Africa, Australia and New Zealand. The table is modified from Stallknecht *et al* (41) 2008 and with data added from the UK Government website . The UK autumn/winter 2021/22 outbreak is tick marked in red with species bolded.

Taxonomic group				A		HPAI
Order	**Family**	**Subfamily**	**Species**	**viruses**	**H5N1**	**UK**
Anseriformes						
	Anatidae					
		Anatinae				
			Gadwall (*Anas strepera*)	✓	✓	
			Garganey (*Anas querquedula*)	✓		
			Common teal (*Anas crecca*)	✓		
			Pochard (Aythya ferina*)*		✓	
			Long-tailed duck (*Clangula hyemalis*)	✓		
			Mallard (*Anas platyrhynchos*)	✓		✓
			Northern pintail (*Anas acuta*)	✓		
			Northern shoveler (*Anas clypeata*)	✓		
			Tufted duck (*Aythya fuligula*)	✓	✓	
			Smew (*Mergus albellus*)		✓	
			Wigeon (*Mareca penelope*)	✓		✓
		Anserinae				
			Barnacle Goose (*Branta leucopsis*)			✓
			Brent goose (*Branta bernicla*)	✓		
			Black Swan (*Cygnus atratus*)			✓
			Canada goose (*Branta canadensis*)	✓		✓
			Egyptian goose (*Alopochen aegyptiacus*)	✓		
			Graylag goose (*Anser anser*)	✓	✓	✓
			Greater white-fronted goose (*Anser albifrons*)	✓	✓	
			Pink-footed Goose (*Anser brachyrhynchus*)			✓
			Bewick's Swan (*Cygnus columbianus*)			✓
			Mute swan (*Cygnus olor*)	✓	✓	✓
			Whooper swan (*Cygnus cygnus*)		✓	✓
		Tadorinae				
			Common shelduck (*Tadorna tadorna*)	✓		
Accipitriformes						
	Accipitridae					
			Buzzard (*Buteo buteo*)		✓	✓
			Red Kite (*Milvus milvus*)			✓
			Rough-legged buzzard (*Buteo lagopus*)		✓	
			Sparrowhawk (*Accipiter nisus*)			✓
			Northern Goshawk (*Accipiter gentiles*)		✓	✓
			white-tailed eagle (*Haliaeetus albicilla*)			✓
Falconiformes						
	Falconidae					
			Kestrel (*Falco tinnunculus*)			✓
			Peregrine falcon (*Falco peregrinus*)		✓	✓

Charadriiformes				
	Charadriidae			
	Lapwing (*Vanellus vanellus*)			✓
	Scolopacidae			
	Curlew (*Numenius arquata*)			✓
	Dunlin (*Calidris alpina*)	✓		
	Woodcock (*Scolopax rusticola*)	✓		
	knot (*Calidris canutus*)	✓		✓
	Turnstone (*Arenaria interpres*)	✓		
	Sanderling (*Calidris alba*)	✓		
	Temmick's stint (*Calidris temminckii*)	✓		
	Stercorariidae			
	Great Skua (*Stercorarius skua*)			✓
Charadriiformes				
	Laridae			
	Arctic tern (*Sterna paradisaea*)	✓		
	Black-headed gull (*Chroicocephalus ridibundus*)	✓	✓	✓
	Common tern (*Sterna hirundo*)	✓		
	Great black-backed gull (*Larus marinus*)	✓	✓	
	Herring gull (*Larus argentatus*)	✓		✓
	Little Gull (*Hydrocoloeus minutus*)			✓
	Sandwich tern (*Sterna sandvicensis*)	✓		
	Alcidae			
	Guillemot (*Uria aalge*)	✓		
	Scolopacidae			
	Green sandpiper (*Tringa ochropus*)		✓	
Ciconiiformes				
	Ardeidae			
	Grey heron (*Ardea cinerea*)	✓	✓	✓
Columbiformes				
	Columbidae			
	Collard dove (*Streptopelia decaocto*)	✓		
	Rock/Feral pigeon (*Columba livia*)		✓	
Galliformes				
	Phasianidae			
	Pheasant (*Phasianus colchicus*)	✓		✓
Gaviiformes				
	Gaviidae			
	Red-throated diver (*Gavia stellata*)	✓		
Gruiformes				
	Rallidae			
	Common moorhen (*Gallinula chloropus*)		✓	
	Eurasian coot (*Fulica atra*)	✓	✓	✓

Passeriformes		
	Blackbird (*Turdus merula*)	
	Swallow (*Hirundo rustica*)	✓
	Carrion crow (*Corvus corone*)	✓
	Jackdaw (*Corvus monedula*)	✓
	Rook (*Corvus frugilegus*)	
	Redstart (*Phoenicurus phoenicurus*)	✓
	Whitethroat (*Sylvia communis*)	✓
	Starling (*Sturnus vulgaris*)	✓
	Garden warbler (*Sylvia borin*)	✓
	House sparrow (*Passer domesticus*)	✓
	Spotted flycatcher (*Musicapa striata*)	✓
	Willow warbler (*Phylloscopus trochilus*)	✓
	Yellow wagtail (*Motacilla flava*)	✓
Pelecaniformes		
Suliformes		
	Cormorant (*Phalacrocorax carbo*)	✓
Ardeidae		
	Little egret (*Egretta garzetta*)	
Piciformes		
Picidae		
	Great spotted woodpecker (*Dendrocopos major*)	✓
Podicipediformes		
Podicipedidae		
	Great crested grebe (*Podicps cristatus*)	
	Little grebe (*Tachybaptus ruficollis*)	

Appendix

Short technical information on avian influenza viruses
What are avian influenza viruses?
Influenza viruses are enveloped viruses possessing a segmented genome of negative-sense, single-stranded RNA belonging to the family Orthomyxoviridae.

They are divided into six genera, influenzavirus A, influenzavirus B, influenzavirus C, influenzavirus D, Isavirus, and Thogotovirus (42–45) table 2.

Table 2. Genus of virus and hosts infected

Genus	**Host Species**
Influenza Virus A	Birds, **People**, Mammals, Horses
Influenza virus B	**People**
Influenza virus C	**People**, Pigs
Influenza virus D	Cattle, Pigs
Isavirus	Fish
Thogotovirus	Cattle, Camel, Sheep, Goat, **People** (rare)

To date there are 11 different segmented RNA virus families Orthomyxoviridae being one of them (46). The segmented genome of influenza viruses and their error-prone genomic replication rate (47) affords them the capability of undergoing reassortment with other influenza viruses to generate entirely novel influenza viruses that are antigenically distinct; this process is called antigenic shift and could potentially cause the next pandemic.
It is possible that this process of genetic reassortment could occur in a person who is co-infected with a bird influenza A virus and a human influenza A virus. It is also possible for other mammals to act as mixing vessels to produce reassorted novel influenza A viruses (14,48) as was the case in the swine flu pandemic of 2009.

Only influenza A and B viruses have caused epidemic disease in humans; an epidemic is a sudden increase in cases of a disease in a single population in a given area or country. Influenza A viruses on the other hand can cause pandemics; a pandemic is an epidemic that has spread to many countries or continents affecting many populations. Three influenza pandemics have occurred in the twentieth century: the **1918** H1N1 pandemic (Spanish flu), the **1957** H2N2 pandemic (Asian flu), and the **1968** H3N2 pandemic (Hong Kong flu) (49). One pandemic was declared by the World Health Organisation in **2009**. This pandemic was due to an influenza A virus 2009 H1N1 (swine influenza) that had been circulating in pigs in Mexico and crossed the species barrier to humans. There were 200 countries involved (50,51).

Influenza A subtypes

Influenza A virions (virus particles) have two types of viral glycoproteins

(spikes) inserted in their envelope: the hemagglutinin (HA) and neuraminidase (NA). These glycoproteins or spikes are used to classify influenza A viruses into subtypes. To date there are 18 different HA and 11 different NA types known, of which 16 HA and 9 NA subtypes have been isolated from wild aquatic birds (52), whilst H17N10 and H18N11, having also been identified in bats (53,54).

Low and high pathogenicity

Avian influenza A viruses are further categorised into low pathogenic avian influenza (LPAI) viruses and highly pathogenic avian influenza (HPAI) viruses. This is based on the type of disease they cause in chickens as a result of their intravenous pathogenicity index (IVPI) and bears no relation to their pathogenicity in people. Molecular tools are also used to further characterise the viruses (1,55).

The intravenous pathogenicity index (IVPI) is the mean score per bird per daily observation carried out over a 10-day period of 10 six-week-old chickens inoculated intravenously with the virus. The birds are then scored as follows:

– Score 0 = normal

– Score 1 = sick

– Score 2 = very sick or paralysed

– Score 3 = dead.

An IVPI of 0 means that no signs were seen in the 10-day observation period. An IVPI of 3 means that all birds died within 24 hours. (4)

References are located at the back of the newsletter

Is vitamin B deficiency adding to the challenges confronted with hand rearing of Common swift (*Apus apus*)?

Written by: Kasia Szczypa Ph.D. of Biological Sciences, SPARE (Swift Protection Association Reigate), reigateswifts@gmail.com

It has been more than 12 years since a CD **"Rehabilitation of Swifts, Swallows and Martins**" became available from the website: swift-conservation.org. Gillian Westray specifically designed this CD for the wildlife professional to help them deal with rearing swifts during breeding season in the UK.

Among the documents compiled by Gillian Westray, there is information on veterinary assistance to swifts, which comes from Dr Christiane Haupt who heads the Frankfurt Swifts Clinic and is also a world expert in treating and rehabilitating swifts. The Clinic website is: www.mauersegler.com and it provides relevant and comprehensive information, for example a guide to first aid and treatment. The knowledge about swift rehabilitation is constantly being updated by new research.

As a best example the work of Enric Fusté from Catalonia Wildlife Rehabilitation Centre is highly recommended. His research article (https://www.jzar.org/jzar/article/view/33) has convincingly shown the necessity of using a specific insectivorous food and how badly swifts could perform when they are fed with non-insects-based diet. Even a small amount of these wrong foods can be enough to cause irreversible damage to body composition and feather condition.

In 2016 Enric Fusté set up a website http://falciotnegre.com dedicated to teach people about contemporary methods of rehabilitating swift. This website contains all necessary information on rehabilitation of swifts that is illustrated with videos and photographs, so that it enhances our knowledge on the subject in easy and practical way. Moreover, a specially written protocol (translated to many languages) for handling swifts from the admission to a rehab centre to the moment of release is also extremely useful.

In addition to the importance of an insect-based diet, the proper composition of vitamins and minerals is a key element in successful rehabilitation of swifts. Available on the market, vitamin supplements added to the diet and intended for birds do generally meet the expected daily dietary requirements vitamins from all groups. Despite adequate supplementation of food for swifts with appropriate vitamins and minerals, one must consider the possibility that swifts may still be deficient in some of them. Noteworthy is the high risk of developing vitamin B deficiency in hand-rearing swifts even if their diet was properly enriched.

This article is aimed to present the most relevant aspects related to occurrence and prevention of vitamin B deficiency in hand-reared swifts and was previously presented at Fifth International Swift Conference in Israel in 2018.

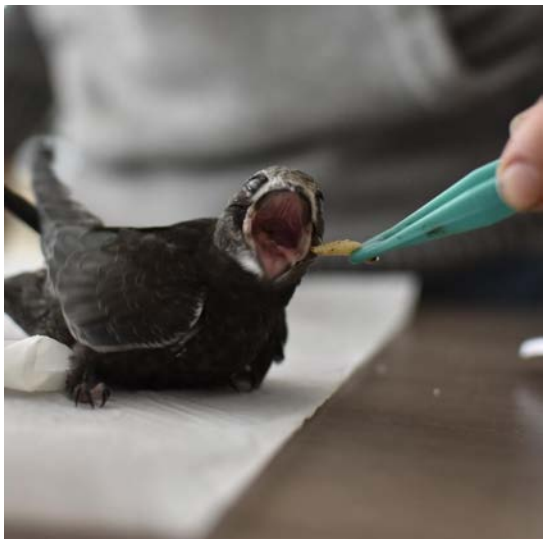
I believe that I first came across symptoms of B vitamin deficiency in hand-reared swifts roughly seven years ago. Although my knowledge on the subject was insufficient at that time, the information that was already available on the website of the Frankfurt Clinic helped me a lot to apply the appropriate treatment, so that the swifts could be released into the wild.Later when I realised that wildlife rehabilitation centres and swift carers had various approaches to this problem, I decided to dig deeper into the problem.

Twelve rehabilitators from seven countries were surveyed about their experience with vitamin B deficiency occurring in hand-reared swifts and about methods they use to prevent it. The survey questionnaire comprised of thirteen questions. Here are summaries of answers to some of them.

The results show that over 80% of respondents had experience with B-hypovitaminosis in hand rearing swifts. The reported prevalence of this condition ranged from 2 to 10% a year.

The occurrence of vitamin B deficiency in all age groups ranging from nestlings and fledglings to adult birds was reported. Fledglings with deficiency symptoms were mostly 4-6 weeks old and almost ready to be released. In addition, cases of vitamin B deficiency were observed in adult swifts kept for a prolonged period (e.g., over the winter).

Almost all respondents believed that there was a relationship between several factors like stress situations, adverse environmental conditions, illness, medical procedures and the prevalence of B-hypovitaminosis. All the rehabilitators, taking part in this study, agreed that the quality and variety of insects provided in swift diet was another very important factor influencing the wellbeing of birds. Moreover, some of the respondents believed that commercially raised feeder insects should be fed with a special enriched diet to enhance their nutrient content prior to being offered to swifts. Regardless of that the survey participants have agreed that it is still essential to offer the birds “the enriched insects” (e.g., dusted with minerals and vitamin supplements or soaked in an infusion of calcium gluconate and vitamin B complex) in one meal daily.



The survey also included a question about symptoms of vitamin B deficiency. Rehabilitators described these as appearing suddenly and often taking a dramatic course. Because the symptoms are usually nonspecific in the beginning there is always a high risk to easily overlook or underestimate them. Initially, there are changes in behaviour manifested by decreased appetite and head tremor. Birds are also prone to neuromuscular problems, resulting in impaired digestion, general weakness, “star-gazing” posture (opistotonus), and frequent convulsions. If not recognised and treated in time, these neurological abnormalities can continue to worsen and have fatal consequences, even leading to death of the bird. Among young birds, the course may be even more dramatic. A case was described where a nine-day-old swift chick was dead within 30 minutes of the first symptoms. It is worth noting that it has been observed that symptoms can also occur in swifts fed a vitamin B-supplemented diet.

Six rehabilitators (50%) used prophylactic injectable form of B vitamin (regular injections of appropriate doses) following the recommendation from the Frankfurt Clinic. The remaining respondents did not inject their swifts and were using oral supplementation only unless deficiency symptoms had occurred. When the initial stage of hypovitaminosis were diagnosed, administration of vitamin B complex by a veterinarian by the subcutaneous (SC) route was usually sufficient to resolve symptoms in a short time (about a half to one hour). The safest site for subcutaneous injection in swifts is the groin, (the skin fold above the knee).

Conclusion

- Swifts are exclusively insectivorous and eat a vast range of insects. When hand-reared they are very sensitive to deficiencies of some minerals and vitamins.
- B vitamin deficiency is only observed in hand-reared swifts. Wild swifts, whose diet is rich and varied, do not suffer from this condition.
- The results from this survey seem to suggest that in spite of good general awareness of vitamin B deficiency in hand reared swifts among people engaged in carrying for swifts further research, effective communication and education are needed to prevent this condition from occurring.

(Photos by Piotr Szczypa, Stacey Fletcher)
The list of references is available on request

Hirundines: An alternative to captive rearing of displaced youngsters

Written by: John Anderson Blyth Wildlife Rescue

The handrearing of Swifts, Swallows and House Martins in particular can be a challenging journey of rehabilitation for even the most experienced of carers. Many rehabilitation centres choose to outsource hand-rearing duties to specialised individuals to ensure a successful outcome.

The handrearing of juvenile Hirundine species is costly, both in time and expense, together with special feeding and nutritional requirements which must be followed correctly to ensure the birds remain in top condition ready for release.

The remains of the original nest formation

The decision to hand rear such species often comes about from the collapse of the original nest – catted individuals and those in similar circumstances will still require hand rearing and a stay in captivity, due to the medical treatments required or injuries sustained. Youngsters that are simply displaced from a nest collapse are good candidates for being placed in an artificial nest directly back at the exact spot of the original nest. However, there must be certainty that the parent birds are still visiting the nest and the approval of the homeowner is given.

With my own experience, these re-introductions are always done within a 24-hour period of nest collapse. Thankfully there are numerous artificial nests available online that can be kept in stock when the need arises. These nests can be sited at the original nest location with a single fixing, usually with the use of ladders at height, if the job can be done safely by a competent person.

Material from the original nest, such as mud, grasses and feathers can be re-used in the artificial nest into which the youngsters are placed. A supportive homeowner can be tasked with observing the nest activity and report any developments. In most cases, the parents return to the nest and, after several hours of investigation, feeding usually resumes and nature continues as intended. Furthermore, for birds lucky enough to survive the migration, an artificial nest placement provides an ideal solid home for any returning birds ready for the next nesting season.

As we are all too familiar, nature does a much better job in rearing young than we can ever achieve in captivity, especially with the more challenging specialist feeders. The rehabilitation world continues to face increasing demands, largely due to ever increasing human-wildlife conflicts driving our workload. Any such opportunities to reduce this workload and place youngsters back in the wild, providing the necessary conditions are met, should be taken where possible so attention can be focussed on the other hand rearing candidates.

A link to a video illustrating a previous nest replacement can be found at ***Blythe Wildlife Rescue Facebook page***

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