

Placement Final Report
Wildlives Rescue and Rehabilitation Centre
September 2013-June 2014



Zoe Leckie

Bsc (Hons) Wildlife Conservation with Zoo Biology

Acknowledgements

I would like to thank the following for providing data and information about their protocols and respective centres:

Steve Bexton and RSPCA East Winch Rescue Centre

Lee Stewart and RSPCA Stapley Grange Rescue Centre

Arminal Scott and RSPCA West Hatch

Dave Risley and Antonia Blacker at Folly Wildlife Rescue

Leanne Ralph at Hessilhead Wildlife Rescue

Mike Rendle

Susan Sroka

Abstract

Wildlives Rescue and Rehabilitation Centre is committed to the care of orphaned and injured British wildlife and their eventual return to the wild. I spent 10 months there learning new skills and going from being a brand new volunteer to running the hospital. The centre takes in a variety of wildlife with its most common species admitted being pigeons (*Columba livia* and *Columba palumbus*) and hedgehogs (*Erinaceus europaeus*). Some rarer species admitted during my placement year included muntjac (*Muntiacus reevesi*), stoat (*Mustela erminea*), muscovy duck (*Cairina moschata*) and common buzzard (*Buteo buteo*).

Whilst many of the animals are taken into the centre because of injuries, during the spring and summer months there is an increase in the number of orphaned animals admitted. With the most common being mallard ducklings (*Anas platyrhynchos*), common blackbird chicks (*Turdus merula*) and blue tit chicks (*Cyanistes caeruleus*).

Some of the orphans that were admitted during the year were juvenile hares or 'leverets' (*Lepus europeaus*). Wildlives had never successfully hand reared orphaned leverets to release and after doing some research it was apparent they were one of the hardest orphaned animals to successfully raise.

My project therefore focused on the hand rearing of four sibling leverets that were admitted as well as looking into other rescue centres methods of hand rearing. This would enable a successful protocol to be enabled that could be used whenever orphaned leverets were admitted in the future.

Project Background , Aims and Methodology

A study into the difficulties associated with hand rearing leverets and the success rates of release from rescue centres.

Wildlives Rescue and Rehabilitation Centre is based in Thorrington, Essex near Colchester. As there were no local places to take injured and orphaned wild animals, Rosie Catford started Wildlives in 1995. Initially comprising of a few simple carriers in her conservatory, the centre now comprises of 6 acres of land (most of which is a nature reserve). In 2003 a small animal hospital was built and animals are generally brought in by members of the public, local vets and the RSPCA. In 2004 Wildlives became a registered charity and relies largely on donations from the public including monetary donations and more practical items such as newspapers for lining cages. The centre is also home to many formerly abused or ill-treated domestic animals as well as some permanent wild residents which could not be released due to long term injuries.

Wildlives charitable objectives are:

- “1.To provide treatment and care for sick, injured and orphaned wildlife with the ultimate aim of rehabilitating them back into the wild
- 2.To inform people about, and to create public awareness of, wildlife and all issues relating to the benefit of wildlife”. (Wildlives, 2013)

Volunteers play a key role in the work at Wildlives as the centre is open 7 days a week, 365 days a year for admissions. From cleaning out cages to providing treatment for sick and injured animals, every job that the volunteers do is vital in trying to rescue and rehabilitate as many of the admitted animals as possible. As industrialisation and habitat loss has increased, admissions of wildlife to the centre have also increased meaning the work Wildlives does is fundamental in the continuation and survival of many native wildlife species.

Wildlives receives hundreds of admissions a year, a vast majority are orphans and in need of rearing. Leverets are considered one of the hardest species to hand rear (Benyon and Cooper, 1991). Wildlives has had no success in the past hand rearing orphaned leverets to release. They are also one of the rarer species admitted into the rescue centre with usually only one or two litters admitted a year. A litter of 4 leverets was admitted into the centre on 13th March 2014, and considering how difficult they are to rear, I focused my project on the difficulties associated with hand rearing orphaned leverets and how to create a successful protocol that could be applied to future leveret admissions.

Aims of project:

- To determine common problems between centres and carers associated with hand rearing leverets
- To find solutions to the problems associated with hand rearing leverets.
- To establish a set protocol to use when hand rearing leverets at Wildlives Rescue and Rehabilitation Centre

Leverets are the given name for juvenile hares, members of the *Lagomorpha* order and *Leporidae* family. Unlike rabbits of the same family, hares do not bear their young below ground in burrows but in small hollows above ground called 'scrapes'. These 'scrapes' can be found in open woodland and fields often close to arable farmland. The young are born fully furred with eyes open and are precocial. The young generally fend for themselves, which to evade predation involves lying completely still and getting as close to the ground as possible to try and camouflage themselves and avoid detection. This allows the mother to leave for food and return once a day for a short interval of up to 5 minutes (usually after dark) to allow them to suckle. The mother can also be often seen on a higher outlook such as a grassy bank overlooking the field with her young in, watching for danger.

Hares are herbivorous and like most small herbivorous mammals are shy and nocturnal, their speed often their only defence against predators. Hares are perhaps most well known for their 'boxing' which occurs in the spring time as females fight off the attention of over enthusiastic males who want to mate (Wildscreen Arkive 2014). Hares' milk is very high in lipids and proteins to fuel fast growth of young (Lumpkin and Seidensticker, 2001). This milk has been hard to emulate when it comes to hand rearing leverets.

The litter admitted into the centre were found near the side of a road and were quite dehydrated when they were brought in by the RSPCA. They were given hydration fluid and a feed of evaporated milk with water. Susan Sroka of the Hare preservation society was then contacted to establish what milk formula would be best to give to them. In the past Wildlives has used a variety of milk formulas but has not had any success. And as Susan has had success with raising leverets and has had 17 years of experience, she was the first port of call in this situation.

The leverets were only exposed to 2 feeders, who at the start had 2 of the leverets each. When one feeder was off the remaining feeder would wear their jacket so the leverets wouldn't get stressed because they recognised the scent associated with their own feeder. When only 2 of the leverets were still alive, the feeders fed whichever one approached them in the enclosure. Having the 2 feeders was for necessity as when one was off, the other could feed them. Leverets were handled as little as possible and suckled off of the bottles without being touched. They also had their own towels kept separate from everything so as not to cross-contaminate. When they were young they were fed in the quiet away from noises or disturbance. When they were permanently housed outside, they had grown to recognise the two feeders and knew it was when they would be fed so would usually approach themselves. As they got older and were being weaned, the feeders usually had to find them hidden amongst the grass but they still fed well.



Figure 1 Initial pen for leverets with plastic box as shelter



Figure 2 Wooden built shelter shown in their night-times cage



Figure 3 The final smaller pen that was placed inside the enclosure before they were allowed to roam free in the large enclosure.

The leverets were initially housed in a unit away from other animals with a plastic open box turned on its side surrounded by hay (Figure 1) Then a specially built box (as suggested by Susan Sroka) was built which was moved out in the daytime to an empty grass filled enclosure away from any activity (Figure 2). They continued to be brought down for feeding and brought in at night. After so many days they were left in their box inside a smaller run in the enclosure (Figure 3). The run was then taken out and they were given free rein in the enclosure.

During the hand rearing of the leverets I contacted a number of different rescue centres and carers to establish their protocols when it came to hand rearing them. I wanted to find common problems and solutions so that a protocol could be established and maybe a greater understanding into why leverets are so hard to rear could be determined. I requested details pertaining to how their leverets were housed whether it was indoors or outdoors and how close to other species or noise pollution. I also asked what formula's they were fed, how often and how many feeders interacted with them. I managed to get some success rate data off of 4 centres with the most information coming from 2 RSPCA institutions that provided several years worth to analyse. This meant that I was able to compare and contrast details from several sources to look for reasons as to why leverets are such difficult animals to successfully rear.

| Correspondence | Rescue Centre/ Carer |
|---------------------------------|------------------------------------|
| Steve Bexton | RSPCA East Winch Rescue Centre |
| Lee Stewart | RSPCA Stapley Grange Rescue Centre |
| Arminal Scott | RSPCA West Hatch |
| Dave Risley and Antonia Blacker | Folly Wildlife Rescue |
| Leainne Ralph | Hessilhead Wildlife Rescue |
| Mike Rendle | Hare Preservation Trust (Ireland) |
| Susan Sroka | Hare Preservation Trust |

Table 1 Showing the sources I contacted to get data about hand rearing leverets and success rates.

Project Results

Table 2 Comparing the protocols for hand rearing orphaned leverets from different Wildlife Rescue Centres and Carers

| Centre/ Carer | Type of Milk | Number of Feeders | Housing |
|---|---|--|---|
| Wildlives | Beaphar Kitty Milk with Double Cream and Bio Lapis | 1-2 Same Feeders | Quiet away from other animals. Semi indoor when small with increasing cage/ enclosure size outdoors when bigger. |
| East Winch Wildlife Centre RSPCA (Bexton. S, Personal Communication, 2014) | Tinned Esbilac with lectade for first 3 feeds | Minimum number of feeders possible | Kept in plastic varikennel on floor in quiet room then moved outdoors to a quiet area once weaned. |
| West Hatch Wildlife Centre RSPCA (Scott. A, Personal Communication, 2014) | Esbilac 1:2 with Avipro | 1 Feeder | Kept in plastic varikennel on floor in quiet room then moved outdoors to a quiet area once weaned. No fresh food till 400g. Single leverets also taught to use litter tray. |
| Stapley Grange Wildlife Centre RSPCA (Stewart. L, Personal Communication, 2014) | Esbilac with lectade for first 3 feeds. | 1 Feeder where possible | Kept in plastic varikennel on floor in quiet room then moved outdoors to a quiet area once weaned |
| Folly Wildlife Rescue (Risley. D et al, Personal Communication, 2014) | Royal Canin with Bio Lapis (possible looking to move to Beaphar kitty milk) | 1 feeder Leverets taught to come to sound | Taken off site to minimise noise, Initially kept in large indoor enclosure, then a large outdoor warmed shed enclosure, then outdoors in the day indoor at night. When weaned kept outdoors dependant on weather. |
| Hessilhead Wildlife Rescue (Ralph. L , Personal Communication, 2014) | Cimicat with Avipro | 1 feeder detached- Taught to suckle from bottle | Kept indoors, usually in cage away from other animals, but sometimes in quiet part of hospital. |
| Mike Rendle (Rendle. M, Personal Communication, 2014) | Cow's milk with Cream | Taught to lap from bowl | Specially built pen outside, minimised contact. |
| Susan Sroka (Sroka, S, Personal Communication, 2014) | Beaphar Kitty Milk | 1 Feeder | Outside in run and hutch during the day, inside at night. Increasing size of cage as they grow. |

The information in Table 2 is collected from 8 different animal rescue centres and carers. 3 out of the 8 centres use Esbilac as their milk formula. 2 possibly 3 centres uses Beaphar Kitty Milk. All 8 centres use minimum contact with the leverets for feeding with 4 having only 1 feeder and 2 having as few feeders as possible. 2 of these feeding styles are detached with one being taught to lap from a bowl and the other teaching leverets to suckle from a detached bottle. Out of the 6 centres 2 bring their leverets in at night time but keep them outside during the day. All 8 centres also employ the idea of keeping the leverets as separate as possible from disturbance. Only Hessilhead keeps its leverets in closer proximity to other animals within the hospital. Mike Rendle and Susan Sroka only rear leverets and no other animals, so disturbance from other species does not occur. At least 6 of the centres/carers move their leverets outdoors as they grow bigger with Mike Rendle already keeping his in outdoor enclosures with shelter from the start.

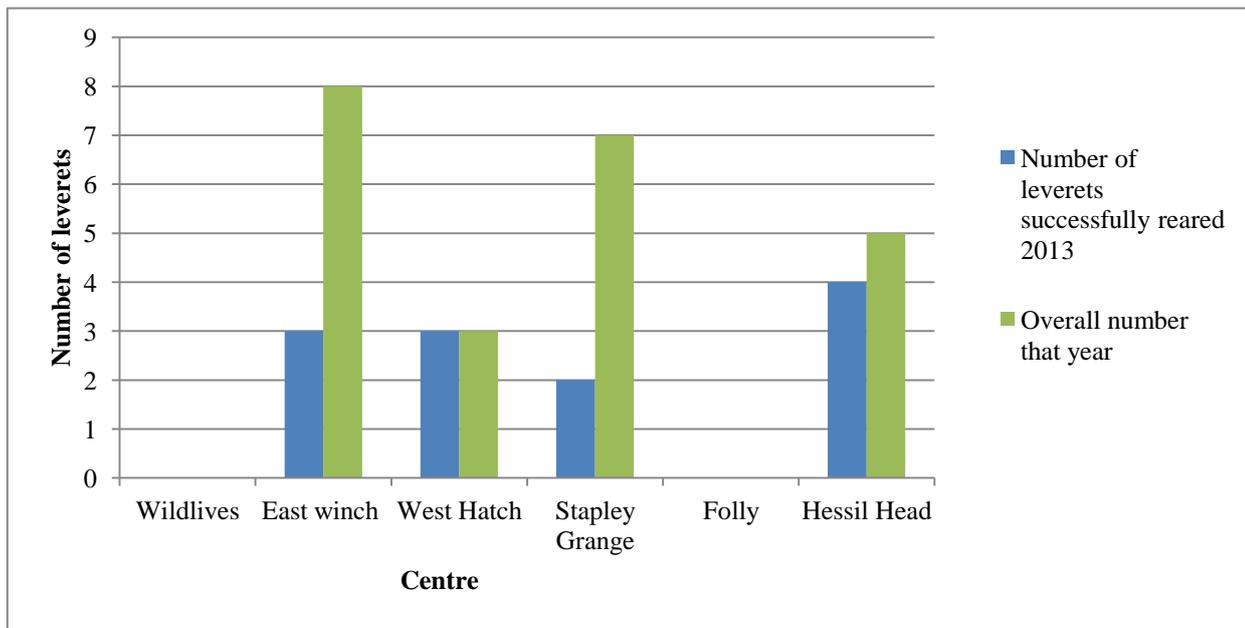


Figure 4 Bar Graph showing the overall number of leverets admitted to centres and the overall successfully hand reared and released in 2013. (Bexton,S, Scott,A, Stewart,L, Ralph,L, Personal Communication, 2014)

Figure 4 shows the data from 6 rescue centres around the UK. Wildlives and Folly show no data as they had no successful releases in 2013 so I could not obtain data relating to admissions. Wildlives and Folly have had no success overall in ever raising leverets to release. The highest success rate is West Hatch with 100% of its admissions being successfully released. The centre with the lowest success rate that received admissions is Stapley Grange with only 28.5% being released. The Highest intake of leveret admissions is East Winch with 8 leverets being admitted in 2013. Out of these 8 only 3 were released giving it a 37.5% success rate.

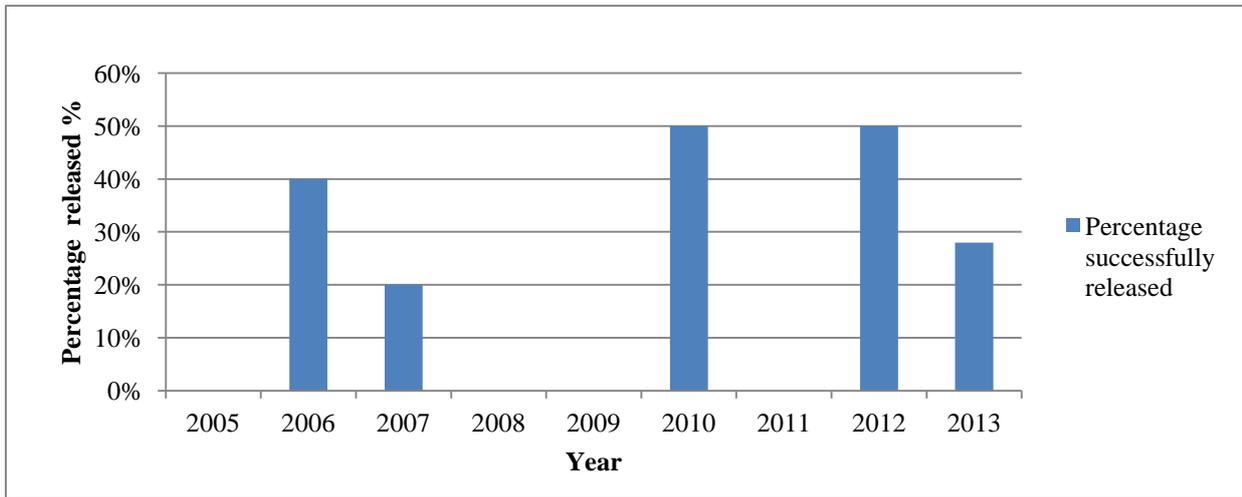


Figure 5 Bar Graph showing percentage of hand reared leverets successfully released from 2005-2013 at Stapley Grange Rescue Centre (Stewart. L, 2014)

As shown in Figure 5 the most successful years for releasing leverets at Stapley Grange are 2010 and 2012 with half of their admissions being reared to release. The admissions for both those years stand at 8 leverets (the highest out of all the years) with four being successfully released each year. Stapley Grange also have a policy where if leverets are found uninjured they can be put safely back straight away so some of the admissions were not necessarily hand reared in the centre but were considered successful releases. In the 2008 and 2011 there were no leverets admitted so there is no success rate. In years 2005 there was only 1 leveret admitted and in 2009 there were 2 but none survived to release.

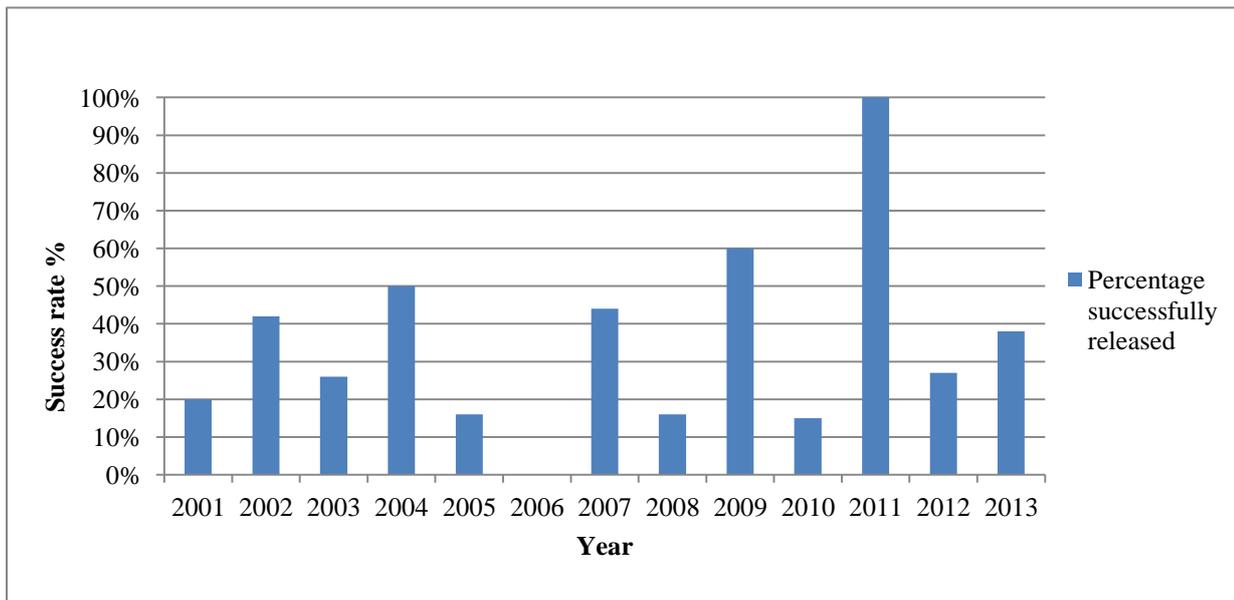


Figure 6 Bar Graph showing percentage of hand reared leverets successfully released from 2001-2013 at RSPCA East Winch Rescue Centre. (Bexton. S 2014)

As displayed in Figure 6 the data from East Winch Rescue Centre dates back 4 years more than Stapley Grange so there is 13 years of information. The year with the highest success rate was 2011 but there was just 1 admission that year. 2009 was the next most successful year with 3 out of 5 leveret admissions being released. The highest number of admissions occurred in 2012 at 18 leverets but only 5 of those were released successfully. In 2006 there was only 1 admission and it had to be put to sleep, so there was a 0% success rate that year. There were no years like Stapley Grange with no admissions but 9 out of 13 of the years the success rate was below 50%.

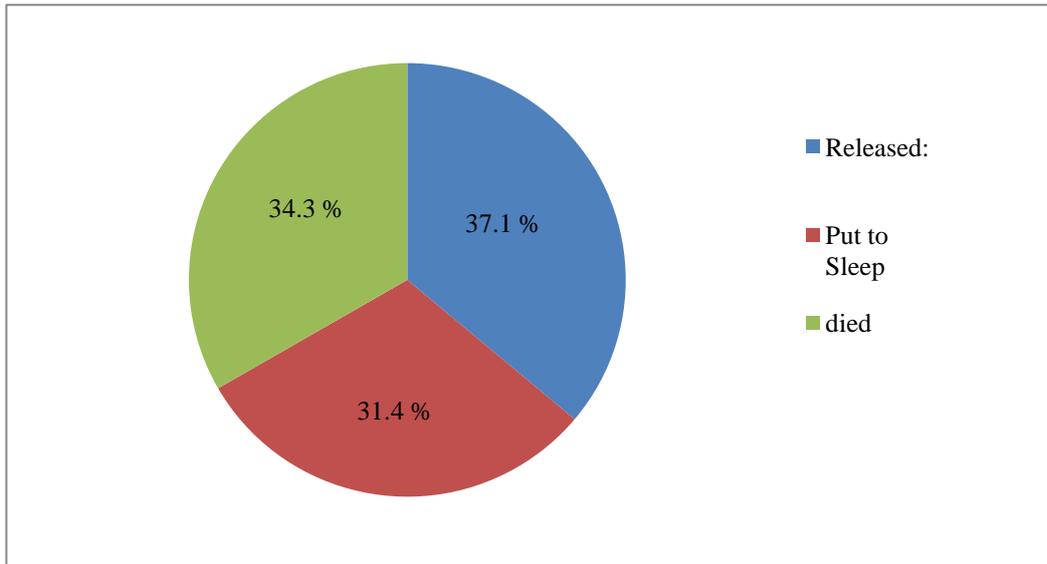


Figure 7 Pie Chart showing overall percentage outcomes from 2005-2013 for RSPCA Stapley Grange Rescue Centre (Stewart.L 2014)

As shown in Figure 7 the overall success rate for the 9 years recorded at Stapley Grange stands at 37.1 % which is 13 out of 35 leverets successfully hand reared and released. This means that the total amount that were not released and did not live stands at 65.7%. As stated before, Stapley Grange returns healthy leverets if they uninjured to the same location they were found. If we remove the 6 leverets that were immediately returned, the overall released hand reared leverets equals 20%. If those immediate returned leverets are removed from the total admissions the percentage increases to 24%.

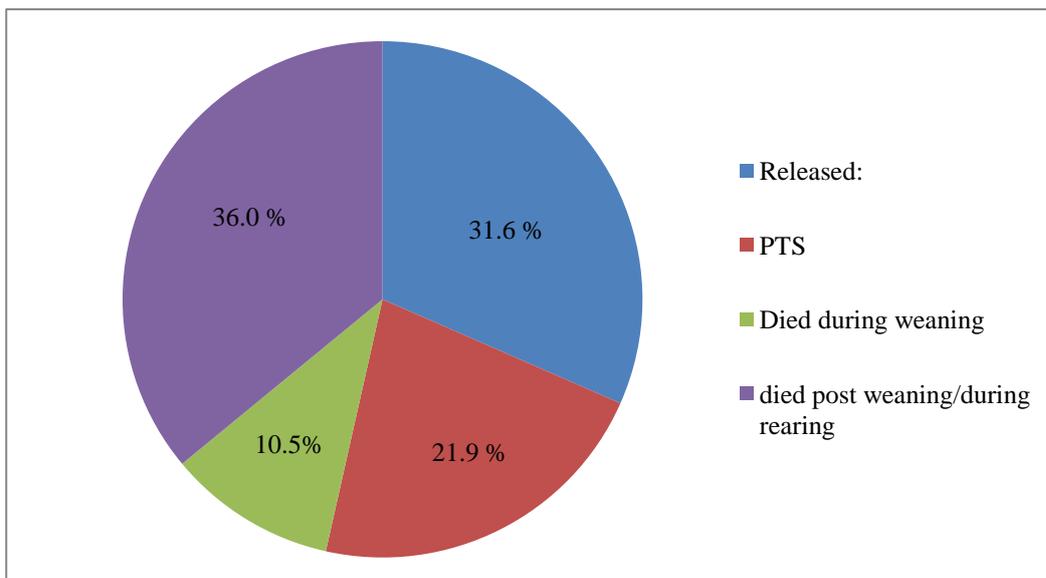


Figure 8 Pie Chart showing overall percentage outcomes from 2001-2013 at RSPCA East Winch Rescue Centre (Bexton. S 2014)

The overall successful rate for hand reared leverets is 31.6% for the 13 years of data from East Winch. This means that out of 114 admissions 36 were successfully reared to release into the wild. The overall percentage of those that did not survive to release equals 74.5%. East Winch provided data as to whether the leverets died during or after weaning. The majority of leverets that died of injury or complication overall stands at 46.5%. Just of a third of all admissions in 13 years were released successfully.

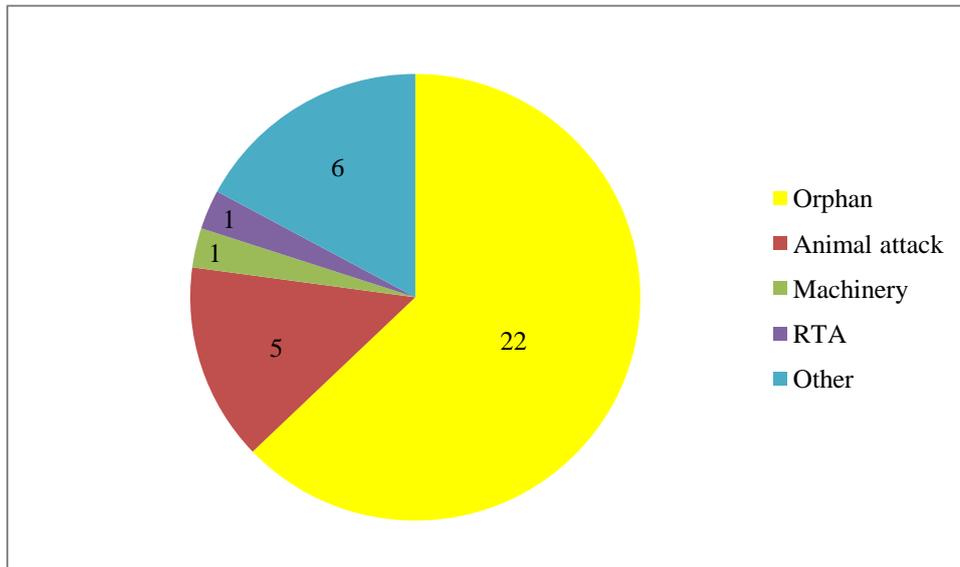


Figure 9 Pie Chart showing reason for admission for leverets from 2005-2013 for RSPCA Stapley Grange Rescue Centre. (Stewart. L 2014)

Out of the 35 admissions in 9 years, 62% are down to being orphaned. This means that the juvenile Hares were found by themselves with no parent in sight or the parents had been found dead. One leveret was found after being in a collision with a car noted as ‘RTA’, and one leveret was caught by a strimmer noted as ‘Machinery’. The 6 ‘Others’ are all down to injury with unknown cause.

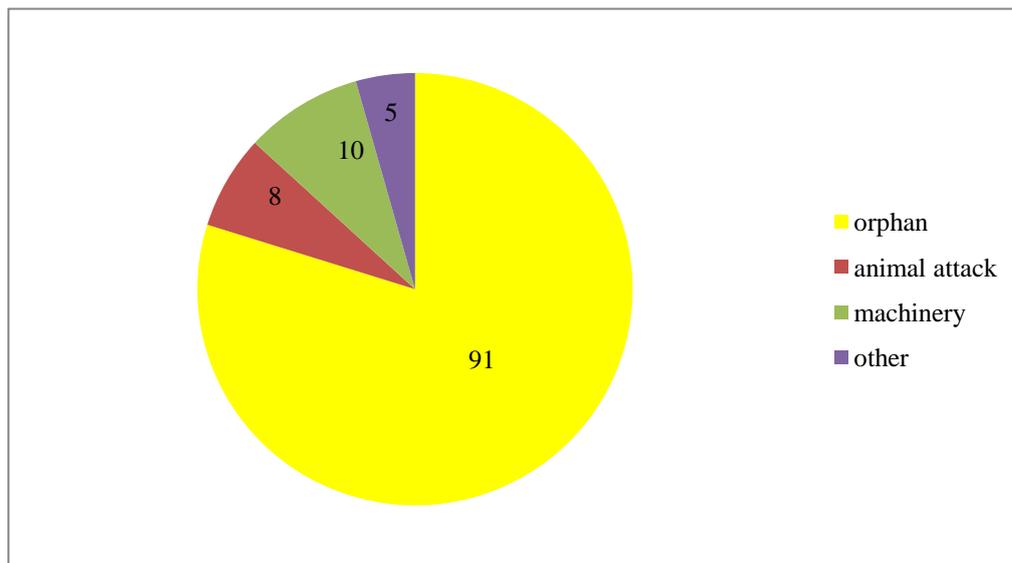


Figure 10 Pie Chart showing reason for admission for leverets from 2001-2013 for RSPCA East Winch Rescue Centre. (Bexton. S, 2014)

As shown in Figure 10, out of 114 admissions over 13 years, 79% are down to the leverets being orphaned. Although there are more leverets admitted overall compared to Stapley Grange the most common reason for admission is still finding them abandoned or parents dead. 10 admissions of leverets were brought into East Winch because of machinery compared to Stapley Grange with just 1 admission. Machinery is a common problem as Hares often have their litters in arable land where large machinery is used, and often mothers are killed and leverets injured.

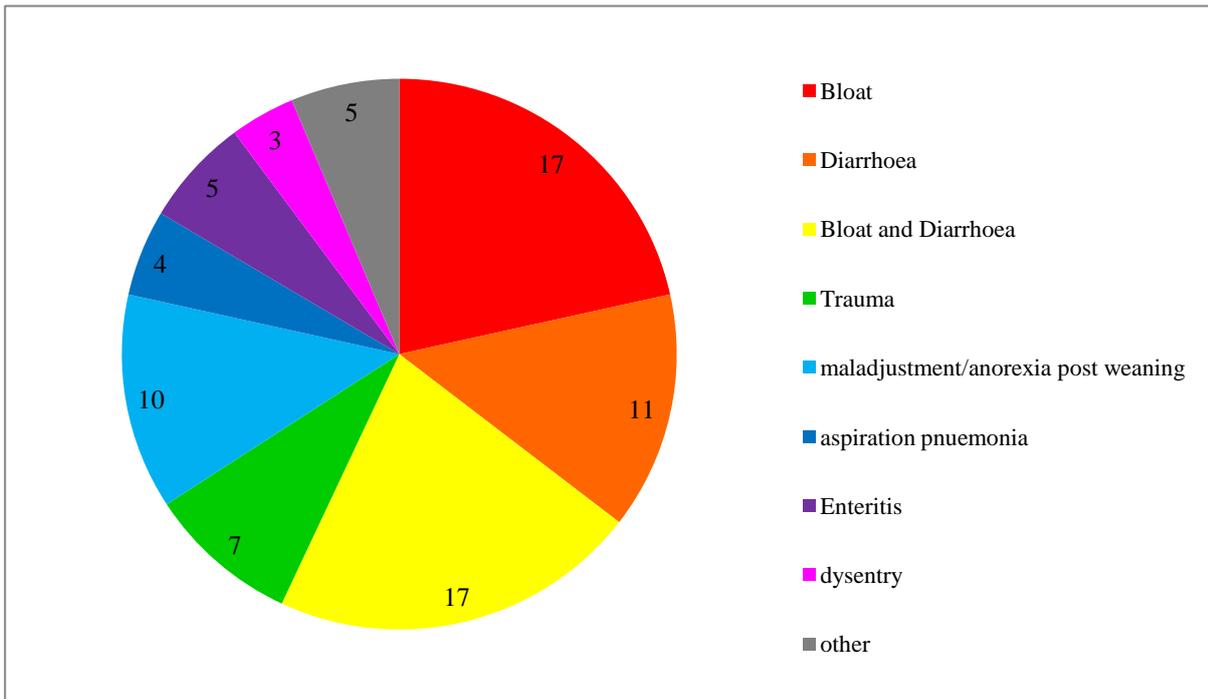


Figure 11 Pie Chart showing cause of death of Leverets at RSPCA East Winch Rescue Centre from 2001-2013. (Bexton, S, 2014)

RSPCA East Winch Rescue Centre managed to provide the reason for cause of death for the leverets that were admitted over the 13 years. The data in Figure 11 covers the leverets that died and were put to sleep stating the reason. The most common cause of death is Bloat at 21% out of the 79, along with another 21% being down to Bloat and Diarrhoea. Diarrhoea by itself stands at 13%. This means that 56% of all causes of death are down to Bloat and/or Diarrhoea. 12% of deaths are down to Maladjustment /Anorexia post weaning which means that the leverets lost weight and did not eat after bottle feeding had stopped. The 3 cases of dysentery stem from a suspected infectious outbreak. The majority of the deaths can be grouped as gastrointestinal problems as Enteritis, Bloat and Diarrhoea all fall under the category of problems found in the gut. 3 out of the 5 in the ‘other’ category died of typhlitis which is an inflammation of the cecum in the large intestine. 1 out of the ‘other’ died of colitis- and inflammation of the colon. This means that 68% of the deaths are down to gastrointestinal problems. If we group all of the categories involved with digestion then all of the gastrointestinal problems with an addition of those that died of ‘maladaption/anorexia post weaning’ increases the total to 81%.

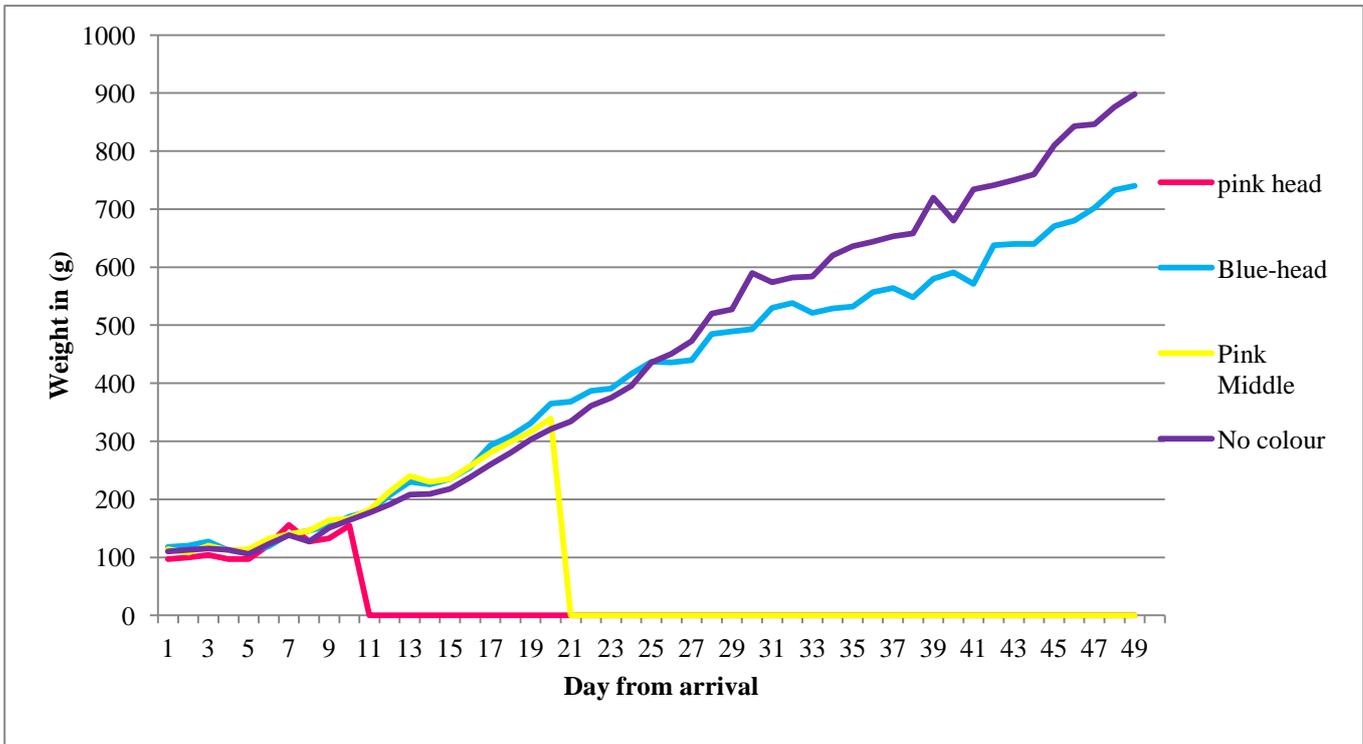


Figure 12 Line graph showing the daily weight (g) and progress of 4 orphaned leverets admitted in Wildlives Rescue and Rehabilitation Centre on 13/03/14.

In Figure 12 the 4 leverets were estimated at only 3-4 days old on arrival, a drop of nail polish was placed on them to differentiate between individuals. Pink head was the lightest in weight at 97g and blue head being the heaviest at 118g. All 4 leverets lost weight on their fourth day but quickly increased the following day. Pink head died after 10 days, showing signs of diarrhoea two days previously along with a weight loss of 29g. After 21 days Pink middle also died at 339g. Blue- Head injured its leg 23 days in and was given an oral antibiotic (Baytril). 26 days in No Colour overtook Blue-head in weight. After a decrease in weight at 31 days Blue-head was given a 0.03ml of Dexafort (a Steroid). There was a significant drop in weight for both leverets around days 40-41 which could be down to farmers working in the field next door. The leverets were released after 50 days with Blue head at 740g an increase of 622g and No Colour at 898g and increase of 788g.

Project Discussion

One of the main problems I encountered with regards to data collection was receiving it off of other rescue centres. Although I contacted a large number across the UK, very few replied to me, meaning that the data was quite limited and often set out in varying formats making it more difficult to incorporate it into a useful and understandable configuration. I managed to collaborate the data I did receive into a workable format and gain some knowledge about the problems facing hand rearing leverets. The sources I contacted can be found in Table 1. I contacted 14 rescue centres overall of which only 8 replied.

Table 2 shows the similarities between the ways the leverets are kept at different centres. Most of the centres do go through trial and error when it comes to the methodology of raising leverets. Although the RSPCA centres have a protocol, they have established this after years of experimenting with different procedures. The most common factor is that leverets should be kept in the quiet away from other animals and any disturbance from traffic or people. Another common factor is limiting the number of feeders rearing the leverets to they don't become stressed by loads of different people handling them all the time. The best milk formula to give leverets is still under debate. As many of the centres and carers have had success with all different formulas. The most common choices being Esbilac and Beaphar Kitty Milk. This could mean that the milk isn't as big of a factor in success rate when compared to housing or handling.

The information showcased in Table 2 comes from a number of rescue centres and carers around the UK. 6 out of 8 of the centres are mixed centres admitting other species as well as leverets. Out of the 8 centres, 3 are RSPCA run, so follow similar protocols for their admission of leverets. The 2 carers that just admit leverets are more small scale and are the only 2 in the UK that I could find that cared for hares alone with no other species. Mike Rendle is located in Northern Ireland and cares largely for Irish Hares (*Lepus timidus*) and built specialised pens for them which include live video feeds so there is little interaction. Susan Sroka cares for orphaned hares in her garden and summer house, she has been caring for them for over 17 years and has built up a vast knowledge about their hand rearing. Both carers are members of the Hare Preservation Trust and were used to provide the knowledge in raising the 4 leverets that were admitted to Wildlives.

Leverets can be admitted into the centre for a number of reasons as shown in figures 9 and 10; the main problem with leverets being admitted is that because they nest above ground, people see them and believe they have been abandoned and pick them up and take them to rescue centres. This is why Stapley Grange goes by the protocol of returning healthy leverets back to the spot they were found on the same day and hopefully the mother will not reject them or abandon them.

Stress is considered to be the biggest problem when hand-rearing leverets. It was suggested that leverets get so stressed when being hand reared because of the close proximity of other animals (Bexton. S, Personal Communication, 2014). Being a prey animal, they avoid predators such as foxes and stoats and raptors at all cost. In rescue centres, particularly in mixed species rescue centres they are possibly in range of all these species. It is almost impossible to tell if a leveret is stressed apart from possibly minor pupil dilation and usually even experts have difficulty identifying those that are stressed. (Sroka.S, Personal Communication, 2014).

When housing the leverets because of how easily leverets get stressed it is important to gradually increase the size of the pen or enclosure as they grow as they have been known to exhibit severe flight reactions and injure themselves when exposed to a large enclosure (Ashraf et al , 2007).

Hares are known for their large ears and rely on their auditory perception to detect predators, being close to loud noises and busy settings makes them very stressed. There is some correlation between this as at Wildlives the days that farmers were working in nearby fields and causing large quantities of noise, the leverets lost weight. The day Pink Middle died there were tractors nearby and it was the first day they were left out over

night. Whether the change in situation or the loud noise were to blame it is unclear but it is most likely that there was stress involved.

Hares also use their olfactory senses as well as their auditory and even being kept in a quiet environment, feeders can bring the smell of predators in with them. If a feeder goes from feeding a fox to then feeding a leveret, the leverets can smell the foxes scent on the feeder and can become stressed. This is why it is considered that although there is no data to show for it (being such small institutions), the 2 carers who look after leverets and no other species have good success rates and often release the majority of their admissions. This could be down to more dedicated time towards the single species as well as separation from other species.

The most common problem with hand rearing leverets that could be linked to stress are gastric problems. As shown in figure 11, the most common cause of death at RSPCA East Winch Rescue Centre were all related to digestion and gastrointestinal issues. Changes in milk formula can cause diarrhoea, so it is best to stick to one type of milk, obviously going from their mother's milk to a replacement will most likely cause stomach upset and it is vital that the leverets stay hydrated.

Leverets only feed once a day off of their mothers and because the milk is so high in fat and special enzymes they can drink till they are full with no adverse effects. But because the milk replacement can't be given in that kind of quantity to the leverets without it causing bloat and getting diarrhoea, they are usually fed several times throughout the day in smaller quantities (Mead. J, 2014). All the carers and centres adhere to this, as bloat is a common problem even with the multiple feeds. Because of this once a day feed in the wild the large quantities of milk sitting in stomach should be at risk from fermentation but leverets have a special natural antibiotic called 'milk oil' which reduces the fermenting bacteria in the gut. Artificial milk replacers do not contain this milk oil which means that harmful bacteria can be colonised in the gut during hand rearing- which is more likely when stress is affecting the gut's motility. This disturbance in digestion usually exhibits as Bloat or diarrhoea or both. This makes rearing the leverets to be a risk as they are more likely to develop gastric issues. (Bexton. S, Personal Communication, 2014)

Weaning the leverets can be just as risky as milk feeding them. As shown in Figure 8, 46.5% of leverets at East Winch died during or after weaning-nearly all of which were down to gastric problems such as bloat, diarrhoea and enteritis. At weaning, the stomach pH drops and the gut should be colonised by a balance of healthy bacterial flora. Obviously if this doesn't happen, their sensitive digestive systems exhibit problems. (Bexton. S, Personal Communication 2014)

Stress can cause physiological symptoms when it comes to digestion and immunity. So not only can milk formula's cause problems, too much stress can physically effect the way their bodies work. Stress appears to be the biggest issue when hand rearing leverets. Not only can they injure themselves externally but too much stress can affect their bodies' inner workings and cause latent issues leading to high mortality rates.

Because of these issues and the success of hand rearing leverets to release at Wildlives for the first time, a number of protocols were established for the admittance of orphaned juvenile hares in the future:

- Where possible only 1 feeder for leverets.
- Feeder must wash hands thoroughly and wear surgical gown to prevent scents from other sources.
- Leverets must have their own towel
- Bottles must be sterilised
- Leverets considered to be kept outdoors full time straight away
- Leverets far from all other animals and sources of noise.

By using this protocol, Wildlives has managed to successfully release for the first time, 2 hand reared leverets. This protocol and the collaboration with other centres will hopefully continue so that hand rearing leverets successfully will continue in the future for all centres and carers.

If I were to repeat my final project, I would aim to collect more data from other rescue centres, my data set was not as detailed or as large as I would have liked. This may still be difficult as centres may not reply or may not be able to provide the information I need but I would still aim to collect a larger data set. I would also aim to follow the progress at Wildlives of more than one litter of leverets. As my time on my placement was restricted I could only follow the full progress of one litter. If the project were to be repeated I would like to follow the progress of several litters in detail. This could ensure a better understanding of why leverets get stressed so easily and mortality rates are so high. I could also have a vet perform post-mortems on any dead leverets to determine cause of death similar to the leverets at RSPCA East Winch. This would also give a better understanding as to why the successful release rate is so low.

Although it was difficult getting information off of other rescue centres and carers, those that did reply were very enthusiastic and provided useful information, hopefully leading to more collaborations in the future and a better understanding of hand rearing leverets.

Bibliography

Ashraf.N.V.K, Gupta.K, Rathinasabapathy. B, 2007, Hand rearing Black-naped Hare at Coimbatore Zoological Park and Conservation Centre. *International Zoo Yearbook*, 35 (1), 317-320.

Benyon P.H, Cooper J.E, 1991, *BSAVA Manual of Exotic Pets*, 3rd Ed, Cheltenham: British Small Animal and Veterinary Association.

Lumpkin. S, Seidensticker .J, 2011, *Rabbits: The Animal Answer Guide*, Maryland USA, The John Hopkins University Press.

Mead. J, 2013, Rabbit and Leveret Rearing at East Winch [Web blog] Available at <http://blogs.rspca.org.uk/insights/2013/04/15/rabbit-and-leveret-rearing-at-east-winch/#.U9pIT_ldXuI > Accessed [31/07/14]

RSPCA, 2014, The Five Freedoms [PDF] Royal Society of the Prevention of Cruelty to Animals. Available at <<http://www.rspca.org.uk/servlet/Satellite?blobcol=urlblob&blobheader=application/pdf&blobkey=id&blobtable=RSPCABlob&blobwhere=1210683196122&ssbinary=true>> Accessed [30/07/14]

Wildlives Wildlife Rescue and Rehabilitation Centre, 2013, *About Wildlives* [online] Available at <<http://www.wildlives.org.uk>>[31/07/14]

Wildscreen Arkive, 2014, Brown Hare (*Lepus europaeus*), [online] Available at <<http://www.arkive.org/brown-hare/lepus-europaeus/>>[Accessed 30/07/14]