Bearded Vulture European Endangered Species Programme (EEP): Annual report 2018

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SUMMARY

Nestling numbers continued to grow in 2018. It has been the fourth consecutive year with a high and stable production of nestlings inside the EEP: 25 survived fledglings. In total 42 Bearded vulture pairs laid 68 eggs, from which 33 hatched and 25 survived. Unfortunately, from the 25 survived nestlings one chick coming from a private collection could not be included in the EEP because the previous agreement accord could not be sustained. Further, a chick died as a fledgling a few days after abandoning the nest because of an accident. Finally, of the remaining 23 birds, 18 came from the specialized captive breeding centres (20 laying pairs), and five from Zoos (21 laying pairs).

Although 23 chicks have been reproduced inside the EEP, only 13 could be released and supply with birds only 4 of the 5 on-going reintroduction projects (Alps, Andalusia, Baronnies-GypConnect LIFE project and Maestrazgo). This is because most of the chicks were descendants of not common bloodlines.

One new pair (**Centro de Cría Guadalentín) started to reproduce, four new pairs (T. Friedrichsfelde, Prague, Beauval and Belgrade zoos) produced their first clutch and three more pairs (CF Vallcalent, second Prague pair and Poznan zoo) started to mate**.

19 birds have been transferred during 2018, making it possible to establish nine new pairs.

For the first time, the evolution of Bearded Vulture embryos has been documented with photos, being possible to determine if an egg is already fertile by six days of incubation.

For the first time new surgeries have been implemented for Bearded Vultures: leg prosthesis, treatment against Morganian cataracts and inorganic part of bone implantation.

A new bird distribution strategy between Specialized Breeding Centres has been edited to counteract against the West Nile Virus and aspergillosis infections, and reduce long chick transports for adoptions.

In 2018, four adult birds (three males and one female) and one juvenile male less than five months old died. Again, one wild fledgling with feather problems had to be included in the EEP.

Thanks to the financial support from EEP zoos and other organizations, the VCF managed to establish an effective EEP coordination which kept the specialized breeding centre Vallcalent in Catalonia open for 2018 - we thank you for your support, without this the future of the Bearded Vulture in Europe would look bleaker!

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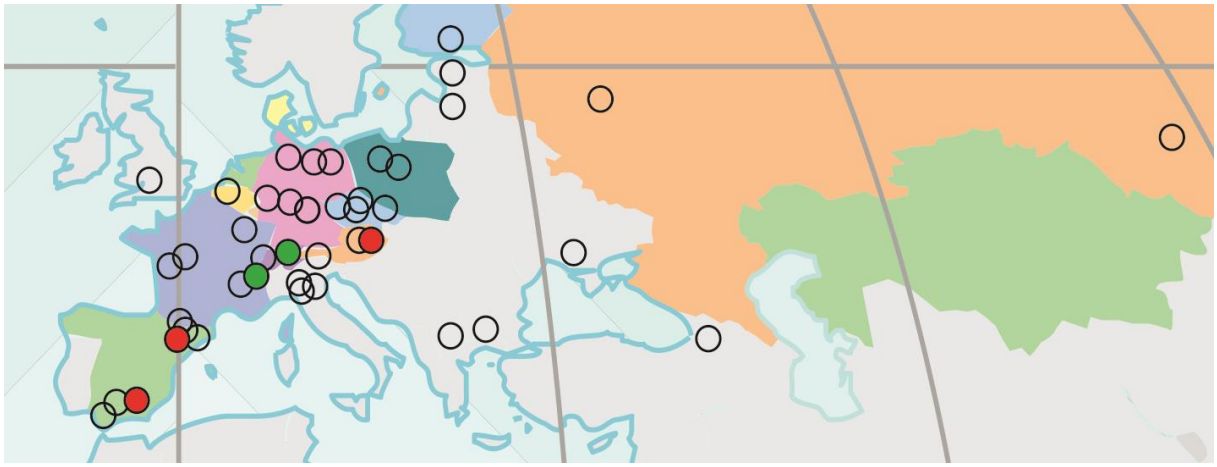
INTRODUCTION

In 1978, the Bearded Vulture Reintroduction Project started in the Alps (FZG 832/78; WWF 1567/78) based on a captive breeding programme. This Bearded Vulture captive breeding network has been included in the European Endangered Species programme (EEP) since the EEP began, and is a VCF-coordinated network of zoos, animal parks, captive breeding centres and private collections aiming to breed this species in captivity for conservation purposes. In 1978, it was clear that only offspring from Zoos could be used, because the autochthonous populations were threatened. At that time nearly 40 bearded vultures were still distributed throughout European zoos, including only one successful breeding pair. From the beginning, it was possible to convince all European zoos to cede their birds for this conservation goal and to transfer most of these birds to the Richard Faust Centre in Austria. Paired birds and juveniles went back to the zoos, and so from 1978-1985 the European breeding network emerged and was a precursor of the later established EEP. The Vulture Conservation Foundation´s final goal is to restore the species across its former range in Europe, and establish a European Bearded Vulture meta-population, with connections between the current European autochthonous isolated populations (Pyrenees, Corsica and Crete) with the reintroduced populations, in a continuum that goes from northern Africa (Morocco) to Asia (Turkey & the Caucasus).

The Bearded Vulture EEP network is composed of a vast number of different types of institutions: private and municipal Zoos, private collections, NGO and Governmental wildlife recovery centres, and several of them are not EAZA (European Aquaria and Zoo Association) members. That's why an international foundation structure (Vulture Conservation Foundation) was created to make sure that all partners accept, respect and follow the guidelines of the EEP.

By the end of December 2018, the EEP included 36 zoos (mainly European), 3 large (red spots) and 2 smaller (green spots) specialized captive breeding centres, and 2 private keepers, keeping a total of 170 birds. The VCF owns 80% of these. From these 170 birds, 77 are males with an average age of 14.9 years old (range from 40 years to 1 year old) and 91 females with an average of 14.7 years old (range from 50 years to 1 year old). Additionally the sex of two descendants from 2018 is still not determined (see table 1 & 2 in Annex).



The distribution of the captive stock over many Zoos lowers bulk risks, e.g. epidemic diseases (December 2018).

Because pair formation in Bearded Vultures can be complicated and dangerous, the EEP decided that it was necessary to create a distinction between centres dedicated exclusively to breeding (zoos and private centres)

and centres dedicated to breeding and pair formation (Specialized Breeding Centres: SBCs). The role of the former is to house already established pairs and to breed the maximum number of offspring from them, while the latter, is where specialized staff are responsible for establishing new pairs, taking in new founders (injured birds from the wild), adopting chicks, housing problematic birds, and creating a genetic reserve by receiving specimens from all of the genetic lineages that make up the EEP.

Between 1978 and 2018, 535 juveniles were reared successfully as part of the programme, creating the possibility to broaden the initial goals and continue with the new reinforcement project that started a year ago in Corsica. The reared offspring have been used for reintroduction projects in Europe: in the Alps (223), Andalucía (54), Grands Causses (15), Sardinia (3), Corsica (4), Maestrazgo (2) and for the captive breeding network (234).

BREEDING RESULTS 2018

2018 has been the fourth consecutive year with a high and stable production of nestlings inside the EEP. In total 42 bearded vulture pairs produced 25 fledglings from the 68 laid eggs. There was the possibility to break the 30 chick's barrier, but with the unusually high mortality of chicks, "only" 25 birds survived from the 33 hatchlings. Four birds died after being successfully adopted. One of them was still one month old and died because of an infection. Two others in the age of two and three weeks respectively died unknowing the cause of death. Both were found almost eaten by the foster pair, a common behaviour by Bearded vultures: the parents always eat dead chicks. And the last chick died the day after being successfully adopted. It was the first double adoption by this pair. The male, because of the nervousness due to the double adoption, didn't go for food as he normally does. The food request of the older chick provoked the female to take the younger chick after being successfully fed and started to feed the older chick with it. Another chick died during the adoption and three by hatching. Additionally, with the accident of a three months old chick just a few days before sending it to the release, nine potential birds have been lost for the reintroduction projects.

Unfortunately, from the 25 survived nestlings one chick coming from a private collection could not be included in the EEP because the previously agreement accord could not be sustained being necessary to cancel the contract and exclude the breeding pair and its chick from the EEP. Further, a chick died as a fledgling a few days after abandoning the nest because of an accident. Finally, of the remaining 23 birds, 18 came from the specialized captive breeding centres (20 laying pairs), and 5 from Zoos (21 laying pairs).

Although 23 chicks have been reproduced inside the EEP, only 13 were available for the 5 on-going reintroduction projects (Alps, Andalusia, Grands Causses, Corsica and Maestrazgo). Three of them for the LIFE project GypConnect. This is because most of the chicks were descendants from not common bloodlines and additionally since the last decade, males are still a deficit inside the EEP. In the near future, it is necessary to solve this sex imbalance urgently if we want to maintain the same yearly production of chicks as the last four years to assure the continuity of all on-going reintroduction projects and the captive network.

Specialized captive breeding centres

- Richard Faust Bartgeier Zuchtzentrum Haringsee (RFZ)

The RFZ, headquarters of the EEP and with a captive stock of 33 birds at the end of 2017, is specialized in the reproduction of founder birds. At the RFZ eight pairs laid in the breeding season 2017/18. Two of these pairs are composed of very old females with the goal to use them as foster pairs, as there is a very low probability that they could produce a descendant. Three of these are experienced old breeding pairs. A sixth is an adult pair which started to reproduce for the first time in 2013. The other two are young pairs. For the first time, one of them produced a chick during the last breeding season and the second produced a clutch. Unfortunately, the single egg was infertile. From this pair, only the male could be observed mating on the perch near the female.

All together, they produced 15 eggs (eight were fertile) and from them, seven chicks hatched. Unfortunately, one chick died at an age of 11 days old, eight days after being successfully adopted by an experienced breeding pair. This chick was removed from the nest the day after hatching because it was too weak. After three days of hand-rearing it was successfully adopted.

One of the breeding birds from Richard Faust Centre (40km from Vienna, Austria).

Something special occurred this breeding season at the RFZ: **for the first time a single breeding pair has produced two clutches and produced the first and last juveniles of the breeding season in the entire Captive Breeding Network**. The pair, a male born at the centre in 1989 and a female (1992) who came from Tierpark

Friedrichsfelde in Berlin, first bred in 2002 producing a single chick. Since then the pair have gone on to be the centre's most successful breeding pair, in total they have produced 22 chicks, many of which were reintroduced in the wild to help boost the wild population of the species. On the 26th of November 2017 the female laid a single egg, or so the staff thought. In fact, the female had actually laid two eggs, but one disappeared soon after, and the female kept incubating the one egg. After being incubated for 55 days, the staff was concerned that the egg was infertile or that the chick was unable to hatch, so they removed it from the nest and placed it in an incubator. The chick hatched six days later, confirming that it was the second egg of the clutch, and was fostered by another pair at the centre, becoming the first juvenile of the season. After removing the clutch, the pair started to immediately mate again and laid a second single clutch on the 2nd of March from which a chick hatched on the 23rd of April.

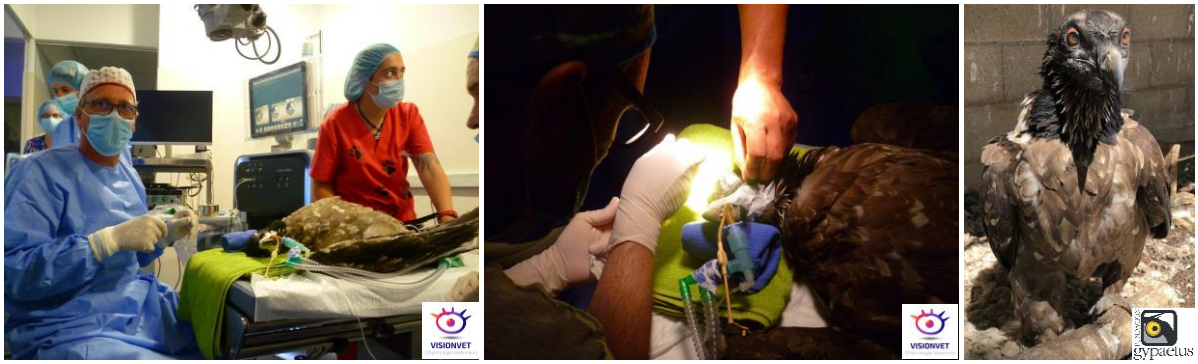
From the six nestlings, three have been released (one in Baronnies - framework of LIFE project GypConnect-, one in Andalusia and one in N.P. Hohe Tauern) and the other three have been included in the EEP (two males and one female).

- Centro de Cría de Guadalentín (CCG)

The CCG, with a captive stock of 21 birds at the end of 2017, is the basis of the Andalusia Bearded Vulture reintroduction project. Since 2013, the number of breeding pairs is seven and for the third year running 14 eggs have been laid. All nine fertile eggs hatched but unfortunately, one hatchling died the day after the adoption surprisingly. During the feeding by the male, he suddenly reacted aggressively and killed the chick. The good news is one of this fledgling is from a new breeding pair.

The first nestling named Rin-Ran suffered an accident by wing flapping. He fell down from the nest platform resulting in paralysis to the legs and injuries to her head. Whilst Rin-Ran recovered from her leg injuries, the staff at the centre noticed she was finding it difficult to find food. She was transferred to a veterinary hospital specialising in ophthalmology conditions ("Clínica de Oftalmología Veterinaria Visionvet", Sevilla) where she was diagnosed with Morganian cataracts caused by the trauma to the head, Rin Ran was gradually losing her sight.

Thanks a crowdfunding campaign launched by the Fundación Gypaetus -responsible for the management of the Guadalentín Breeding Center- it was possible to raise the €2300 needed to perform the operation which was successfully done on the 18th of July by Dr Fernando Sanz and his team from the veterinary hospital Visionvet. **It's the first time that the operation to correct this condition has been attempted for a Bearded vulture**.



*Rin-Ran during and after the operation (*Veterinary hospital Visionvet *and CC Guadalentín, Spain).*

Consequently, from the eight available chicks, six nestlings have been released (1 in Baronnies -in the framework LIFE project GypConnect-, 2 in Andalusia, 2 in the new project Maestrazgo and 1 in N.P. Hohe Tauern) and two females were included in the captive breeding network.

Further three hatchlings have been successfully adopted in Guadalentín. One was coming from the Recovery Centre Torreferrussa and two from de Centre de Fauna Vallcalent. Both chicks from Vallcalent have been released in Switzerland.

The Guadalentín Breeding Centre is situated in the heart of the N.P. from Cazorla at 1300m a.s.l. (Andalusia).

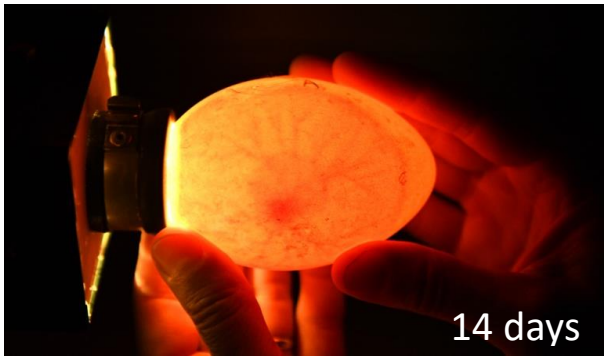
- Centre de Fauna Vallcalent (CFV)

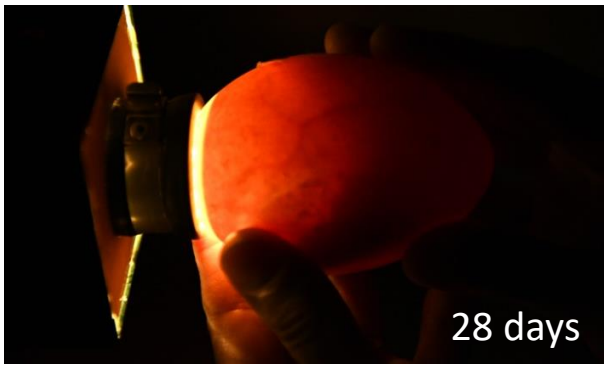
This centre is one of the five rehabilitation stations from the Generalitat of Catalonia, located in Lleida (Spain), and has a Bearded Vulture captive breeding Unit, which is managed by the EEP species coordinator (staff from the Vulture Conservation Foundation). One of its priorities is to get offspring from difficult birds, which didn't reproduce elsewhere, regardless of quantity as is the case of the Guadalentín Breeding Center (Andalusia, Spain).

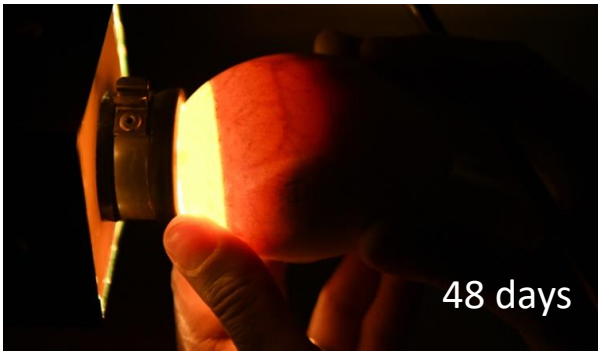
At the beginning of the breeding season, 13 birds were housed in CFV facilities (three of them are from the Pyrenees). Three pairs laid seven eggs, from which six were fertile and five chicks hatched. Unfortunately, the last chick died the day after being successfully adopted. It was the first double adoption by this pair. The male, because of the nervousness due to the double adoption, didn't go for food as he normally does. The food request of the older chick provoked the female to take the younger chick after being successfully fed and started to feed the older chick with it. A new young pair, which was fertile, laid the last egg but it broke accidentally after three weeks of incubation. The pair received immediately a dummy egg, which was incubated additionally for 65 days.

Like the two experienced breeding females have problems by the incubation being necessary to incubate all their eggs artificially -all six produced eggs have been removed from their nest almost since the laying day and being candled daily-, it was possible to monitor and document the embryo evolution with pictures, giving in the future all EEP Partners the possibility to recognize the right evolution of Bearded Vulture chicks by egg

candling. One of the results of the study is that unpigmented eggs can be already determined if an egg is fertile or not with an age from 6 days. **By candling fertile eggs the shadow of the yolk has doubled its size**.







From the five chicks produced, two needed human help, being necessary to remove them from the egg. Only two could be reared at Vallcalent, being necessary to transfer the remaining two to Guadalentín for their adoption.

Chick BG 980 needed special hatch assistance because of his big size (Centre de Fauna Vallcalent, Lleida, Spain).

This season "Kazajo", the human imprinted male, again was stimulated by their human keeper and used as foster male. He could rear the first hatched chick successfully at Vallcalent Breeding Center.

CF Vallcalent imprinted male with his adopted chick BG977

Finally from the four survived chicks three have been released (one in Baronnies -framework LIFE project GypConnect-, and two in Switzerland) and the fourth, the male raised by "Kazajo", has been included in the EEP.

- Breeding centre Asters (Conservatoire d´Espaces Naturels Haute Savoie)

In November 2017, the construction of the new centre was finished. However, the breeding season was still running, since breeding pairs were already in breeding stimulus and so it was not recommended to move them. Consequently, it was decided to transfer only a young pair coming from Vallcalent. Further, the young fledgling from Bargy nord breeding pair, although he was well fed by its parents, it was necessary to recover it because when flying he only did mini flights with intensive wing flapping losing altitude and landing 20 to 50m lower. By feather control it was found that part of the plumage has no barbules, being impossible to hold itself in the air.

During this breeding season, it could be confirmed that the old breeding pair BG297 x BG115, which was housed since summer 2016 in Vallcalent, needed intensive management to get descendants, being necessary to remove each clutch as soon as it has been laid because the female was limping on her left leg. At the end of the season, it was decided to leave the pair in Vallcalent where the specialized staff is present. The second adult pair BG454 x BG502, where female exchange occurred during last spring, pair bonding and first mating

could be confirmed during the breeding season. On the 14th of June, the pair was transferred jointly with a young pair from Guadalentín to Asters.

- Breeding center in Arth-Goldau (Natur und Tierpark Goldau)

This small breeding centre is keeping three pairs. This season only two pairs laid a single clutch from which one chick hatched. The successful breeding pair received the clutch from the other pair immediately when their egg broke. The hatched chick was successfully reared, but unfortunately, it died because of a collision with the fence a few days after fledging.

Tierpark Goldau is constructing a new breeding unit with the capacity of six breeding pairs. It is previewed to finalize the construction before the next breeding season starts.

☞ **Summary** 20 breeding pairs in the specialized captive breeding centres laid 38 eggs. From these 38 eggs, 22 chicks hatched and 19 fledged. Additionally, one bird died a few days after fledging. From the 18 survived fledglings (12 males and 6 females) 12 had been released (4 in the Alps, 3 in Andalusia, 3 in Baronnies -framework LIFE project GypConnect- and 2 in Maestrazgo) and 6 kept for the EEP (3 males and 3 females). Additionally, one new pair produced its first clutch, and another pair was observed mating for the first time.

Asters new breeding centre (November 2017, France).

Zoos, animal parks & private collections

- Zoos & animal parks

The Zoos play a crucial role in the EEP and the conservation of Bearded Vultures. Although the success rate is on average lower than in the specialized breeding centres, they still contribute substantially to the number of young birds raised annually. Furthermore, by maintaining a captive stock distributed in several separate locations, we decrease the risks (for example, in case of epidemic diseases). In addition, by showing this species as well as publicizing the in-situ conservation efforts to large audiences in several countries, they contribute

significantly to raise public awareness about the species. The zoos help to build core support for vulture conservation that would otherwise be impossible to achieve.

During the 2018 breeding season zoos (Chomutov and Yerevan zoos, and the recovery centres Torreferrussa and Green Balkans) produced 5 fledglings (1 male, 2 females and 2 still sex unknown).

Unfortunately, five hatchlings died at different nestling stages. Two chicks died by hatching (Ostrava and Tierpark Friedrichsfelde zoos). The lost hatchling at Tierpark Friedrichsfelde zoo was the first descendant of the second young pair, which produced a clutch for the first time this season. At the Ostrava zoo, a second chick died three days after assisted hatch, supposedly because of a yolk sack infection. The second chick from the Green Balkans was found dead in the morning at the age of three weeks, 10 days after being successfully adopted by the foster pair at Tierpark Schönbrunn (Austria). And the last chick died one week after a blood sample was extracted for its sex determination at the age of five weeks at Liberec zoo, something that never occurred before inside the EEP.

This year, it was necessary to help the Green Balkans team again with the artificial hatching and chick rearing process. Both chicks had hatching problems, so it was necessary to intervene, removing the clutch from the nest and extracting the chick from the egg. The whole action was assisted via video-skype by the EEP coordinator as well as the hand-rearing and adoption process, advising the Green Balkans team step by step.

The pairs in Beauval, Belgrade, Helsinki, La Garenne, Nuremberg, Parco Natura Viva, Prague, Riga, Schönbrunn, Tallinn, the second young pair from Liberec and the old breeding pair from Tierpark Friedrichsfelde zoos failed to produce a young. Nevertheless, the pairs from Beauval, Belgrade, Parco Natura Viva and Prague produced for the first time a clutch, and we hope that in the coming seasons we will get descendants from them. Further, mating was observed from the two new pairs (second Prague pair and Poznan zoo). From all laying pairs only the Berlin Zoo breeding pair didn't lay eggs.

☞ **Summary** 20 breeding pairs in the zoos laid 27 eggs. From the 27 eggs, 10 hatched and 5 offspring were successfully reared. Only the male from the Green Balkans has been released in Andalusia. The other four have been included for the EEP. Additionally four new pairs produced their first clutch and for two pairs first time mating was observed.

- Private collections:

Only two pairs from three private collections (Czech Republic, England and Monticello, Italy) laid eggs. From the three produced clutches, only one chick hatched by the Czech Republic private collection. Unluckily, this chick couldn't be included in the EEP because the owner of the birds was not able to follow the EEP guidelines, being necessary to exclude him from the EEP.

So in the 2018 season, 42 breeding pairs produced 68 eggs, from which 25 juveniles survived from the 33 hatchlings (see Table 3 in Annex - Breeding pairs in 2018). Unfortunately, one nestling died just after fledging, and it was necessary to exclude one chick from the EEP. From the remaining 23 nestlings, 13 have been released, and 10 were added to the breeding network (see Table 4 in Annex – Offspring in 2018).

From the 35 not hatched eggs, one was found putrefied, and eight broke unknowing the real status of these nine eggs. 16 eggs were removed infertile from the nest. Only 10 eggs were fertile from which one broke after

three weeks of incubation. Five eggs aborted in the middle of the incubation, four a week before hatching and one after pecking the air cell.

On the left picture an adopted nestling and on the right a young Bearded vulture from the EEP just after its release. Between 1986 and 2018, 301 nestlings have been released in five on-going reintroduction projects.

TRANSFERS / INCREASES / LOSSES

Transfers

The final goal of bird transfers is to increase the genetic variability of the captive stock, and at the same time assure in the long term a minimum produced number of chicks per year for satisfying the ex situ (captive breeding network, EEP) and in situ (birds release) needs. Therefore the number of breeding pairs must at least be maintained, and this can be only achieved by building continuously new pairs for replacing potential future loses or breeding failures and assure a yearly minimum production on chicks. In general, the pair bonding scheme is drafted at the same time when the destination of the descendants is determined; genetics and location are the most important criteria to be considered.

In 2018 following the EEP proposal, 19 birds (nine males and 10 females) were transferred with the aim to build/transfer 9 pairs.

As soon breeding season finished on the 14th of June, Asters received two additional pairs: one pair coming from Guadalentín and sent previously to CF Vallcalent BG700 x BG627, formed by a male from 2012 and a female from 2010, and the second pair coming from Vallcalent BG454 x BG502, formed by a male from 2005 and a female from 2006. The male from 2005 comes from the second Asters' pair, which was transferred in summer 2016 to Vallcalent to find out why he was not reproducing with his first female. In Vallcalent, it could be found out that the female was too dominant, being necessary to exchange females. This was done in spring 2017, and during this breeding season, pair bonding could be observed (nest building and mating).

On the 6th of June, a male exchange between RFZ and La Garenne was done. The male from La Garenne, BG 212 (1994) could be definitively confirmed that he is not able to mate with the female. This male, until 2012, was considered as a female being paired with a male. Together during the breeding season 1999-2000, they intensively built a nest. Afterwards, BG 212 received two females and never mated them successfully. He never tried to jump on the females' backs. That's why it was decided to use him as a foster male and try pair bonding

with an old female that is no longer fertile located at RFZ. In exchange, La Garenne received a successful male BG 080 for giving the possibility to get descendants from La Garenne zoo female, BG 130.


On the 25th of July, the pair BG993 x BG896 formed by a male from 2018 and a female from 2016, both coming from RFZ, has been transferred to the completely new rebuilt aviary at the zoo Oasi di Sant' Alessio in Italy during the winter and according to the coordinator's advice.


Oasi di Sant' Alessio zoo after receiving a young couple of Bearded vultures (Italy 2018).

Since 2011, the pair from Riga zoo BG 327 x BG 381 is producing a clutch yearly, but never a hatchling. That's why it was decided to send the pair to Vallcalent to analyse their behaviour and in exchange, the zoo will receive a young pair. On the 29th of September, the pair arrived by car to Richard Faust Zentrum (RFZ). A few days later the staff from Riga zoo safely took the young pair BG977 x BG1006, which arrived on the 5th of October, to Riga zoo. This male BG977, coming from CF Vallcalent, was sent a week before, 29th of September, by plane to join his future female BG1006 at RFZ before sending them to Riga zoo.

On the 14th of October, a big transport was done between RFZ and CF Vallcalent, where several birds have been transferred to their final destination in several steps. Asters centre was used as a meeting point. The pair from Riga zoo BG327 x BG381 and the young pair from RFZ BG1006 x BG911 were transferred previously from RFZ to Asters. On the 16th staff from CF Vallcalent took both pairs and a wild young male with feather problems being

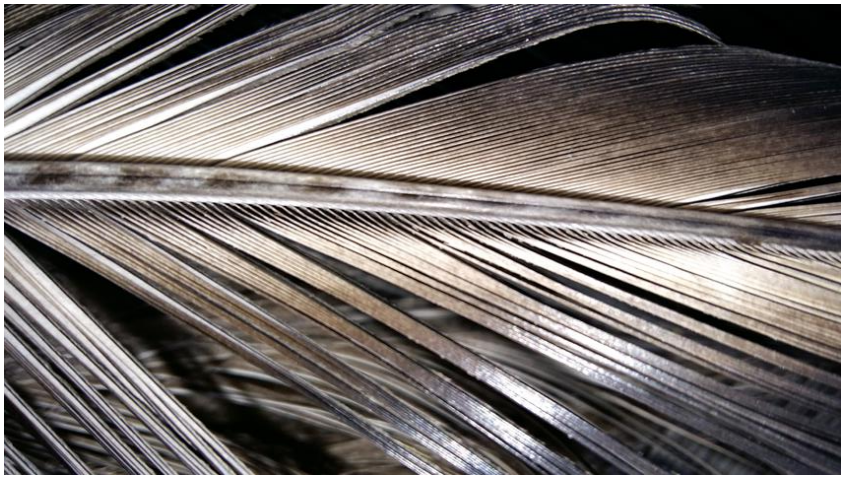
not able to fly BG972 to Vallcalent. A few days later, the pair BG1006 x BG911 and the young male BG972 were sent to their final destination, CC Guadalentín. Unfortunately, on the 1st of November, it was necessary to interrupt pair bonding by BG1006 x BG911 because of severe fights coming from the female. The male was removed to an aviary where the female BG987 from Torreferrussa was located, and they immediately accepted each other. This female arrived at Guadalentín on the 26th of February as a chick for adoption. Thanks to a **crowdfunding campaign launched by the Vulture Conservation Foundation,** it was possible to raise the € 7000 needed for the transfer of all these birds between the Specialized Breeding Centres.

And finally Aachen zoo in its new rebuilt aviary received on the 22nd of November the young female BG982 coming from CC Guadalentín and an imprinted male BG1011 from 2015 coming from Pairi Daiza zoo until receiving her definitively male which arrived on the 8th of July.

Aachen zoo after rebuilding the aviary following the EEP coordinator advise (Germany 2018).

Increases:

During 2018, additionally to the 11 young descendants coming from the EEP, only one new bird could be included in the captive network.



On the 6th of October, like last year, a fledgling named Marty McFly from the breeding pair Bargy nord (France) was covered because after two months flying it was still only making short flights, with intensive wing flapping, losing altitude and landing always 20 to 50m lower. The Asters team monitored this pair. On the 27th of July, it fledged and was not able to fly. "Marty McFly" showed the same feather abnormalities as his one year older brother "Gyphelp". The feathers have no barbules, absent or atrophied and this alteration affected only part of the plumage. On the 18th of October, this female has been transferred to Guadalentín breeding centre to be paired with his sibling and to use them as a foster pair.

From the 11 produced chicks reserved for the EEP, five are females, 3 are males, but 2 of the sexes are still unknown, and one male died just after fledging because of collision with the framework of the aviary. From the remaining 10 alive juveniles, two new couples could be formed: one for Riga zoo and one for CC Guadalentín. A

juvenile male could be paired with a two years older female for Oasi di Sant' Alessio zoo. Aachen zoo and Green Balkans Rescue Centre both received a female, being necessary to wait until next year for a male. And the remaining juvenile with known sex had to be included in the breeding network because just a few days before its release it suffered an accident with severe consequences (see point **OUTLOOK / NEWS**).

Losses:

Five birds died in 2018, four males and one female. From this five, four were adult birds (three males and one female) and one juvenile male less than 5 months old.

On the 23rd of June, the more than 36 years old male BG058 died at the RFZ because of senile decay combined with an aspergillosis infection. This male was sent on the 20th of December 1982 to Antwerp Zoo together with the supposedly female BG047. After 13 years without observing any signs of pair bonding by the repetition of sexing, the supposedly female BG047 turned out to be a male. One year later the male BG058 received a female BG234. After 11 years, on the 16th of January 2007, strong fights suddenly occurred between the pair with serious consequences. The male BG058 suffered severe injuries becoming partially invalid. He was immediately transferred to RFZ where he was treated and afterwards, it has been attempted to use him as a foster male but without success. After this fight, sex analysis was done by BG234 coming out that the sex was also erroneously determined: it was a male.

On the 8th of July, the just fledged male BG1000 suffered a deadly collision with the aviary infrastructure at Tierpark Goldau. The fledgling was found in the morning on his back by the keepers with respiratory distress. They tried to stabilize him with O_2. Nevertheless, in the afternoon, respiratory distress became stronger, and it finally died.

On the 26th of October, the wild adult injured Pyrenean male BG974 and died at the Recover centre AMUS because of a cardiorespiratory arrest during surgery. This male -well reported his history in the EEP annual report 2017- was recovered from the wild with a tibia-tarsal joint infection. After several failed traditional surgeries with the goal to fix the joint, it was accorded to try a new technic that is still in its experimental phase for humans. It's a matter of bone implantation with cell therapy. The origin of the bone is from a dead animal from the same species after removing the organic part of the bone with different products and implanting only the inorganic part of the bone complemented with a cell therapy. The pursued objective with this cell therapy is an osteoinduction, achieving the transformation of undifferentiated mesenchymal cells into osteoforming cells in the presence of certain polypeptide substances. This technic has started to be implemented by AMUS in birds with good success. Unfortunately, the infected joint of the Bearded Vulture male showed a high level of adhesion, being really difficult to prepare the surgery area. This lengthens of the surgery was much as foreseen what finally provoked a cardiorespiratory arrest by the bird.

On the 10th of December, the founder female BG153 died at Centro de Cría Guadalentín with a minimum age of 45 years old. This female arrived at Tierpark Friedrichsfelde in 1974 with unknown age. From the beginning, she was paired with BG 152, a male that died in 2002 due to an injury. The pair was lodged in a large cage together with other large raptors. It took almost 20 years before a first clutch was produced. The following year, in 1992, they produced their first chick BG175. Between 1991 and 2002, nine chicks hatched and seven were successfully raised. From these seven, three have been released two are still alive and reproducing, BG175 & BG322, one is not able to mate BG212, and the fourth was killed by the female in the second year being together. In 2002 the female BG153 was transferred to CC Guadalentín and paired with the famous mandible injured wild Pyrenean male BG286. Between 2003 until her death, she produced 26 eggs from which 15 hatched and 10 chicks survived. In 2016, being more than 40 years old, she still produced two descendants, which are included in the EEP. From the 10 produced descendants, seven are included in the EEP, and all are still alive (three males and four females). Further, this pair BG286 x BG153 has adopted a high number of chicks, rearing most of the time two chicks.

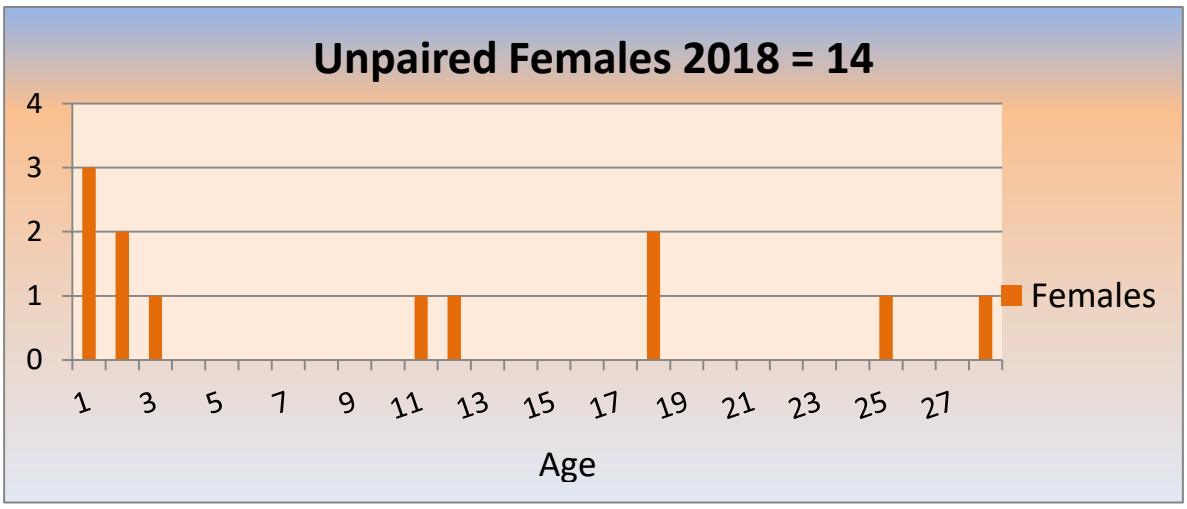
BG286 x BG153 with their chicks, BG453 and BG456 in CC Guadalentín (Andalusia, Spain, 2005).

On the 23rd of December, the founder male BG134, with a minimum age of 48 years old, died at Prague zoo because of senile decay combined with an aspergillosis infection. This male with his female arrived on the 11th of March at Prague zoo as a juvenile. During the breeding season 78/79, they produced their first clutch, but it was necessary to wait 10 years before their first descendant was produced BG133. Between 1978 and 2009, 10 chicks hatched and nine survived, from which five have been released. All four descendants included in the EEP have already reproduced, and three are still alive.

SEX RATIO INSIDE THE EEP

Although 10 descendants have been included in the EEP, it was not possible to counterbalance the number of male losses suffered during this year (four males and only 1 female) because most included birds are females, increasing the existing sex imbalance inside the EEP again.

This will make it necessary to include as many males as possible in the EEP for the following breeding season.



NEW PARTNERS

This year again two zoos expressed the wish to join the Bearded Vulture EEP: Miskolc Zoo (Hungary) and Dierenpark Zie-Zoo at Volkel (Netherland). It was accorded that the following year after the breeding season they will be visited by the EEP coordinator and discuss the possibility to re-use one of their aviaries to hold a young pair of Bearded Vulture or to build a new aviary.

PROBLEMS WITHIN THE BEARDED VULTURE EEP

As it was mentioned in the last year report, West Nile Virus appeared for the first time at the specialized breeding centre Vallcalent (Spain) and we are faced with the problem that transfer of chicks for adoption in

airplane cabins is no longer allowed, announcing the needs to draft a new EEP structure and bird distribution strategy between specialized Breeding Centers with the goal to reduce long travel journeys for chick adoptions and to assure the survival of fledglings, particularly those coming from less common bloodlines inside the EEP.

The strategy to reduce chick's transport is to build self-sustainable small breeding nucleus in each country. Actually, in Spain, France, Germany, Austria, Czech Republic and Italy, the number of existing pairs in each country should be sufficient to be mostly self-sustainable as soon all pairs become sexually mature. Nevertheless, as each year not all pairs will reproduce or in one of the countries the number of hatchlings will be higher than potential foster pairs, it was necessary to draft this new strategy for specialized Breeding Centers.

On July 2018, the new strategy for bird distribution between specialized Breeding Centers was edited and distributed inside our EEP partners. The points to emphasize are that:

• **Richard Faust Breeding Centre, RFZ** because of its background and knowledge, its function will be principally to receive most of the founder birds with the goal to reproduce with them, become the centre reference for adoption for chicks produced in central Europe and establish foster pairs with not reproducing birds.

• **Bearded vulture Captive Breeding Unit at the Centre de Fauna Vallcalent, CFV** because of its location in a recovery center and specialization on artificial incubation, its function will be to receive recovered wild birds for treatment (specially from Catalonia), birds with severe physical disabilities -requiring periodically vet attention- for reproduction, couples with breeding difficulties from other zoos for analysing and couples that require specific management and/or artificial incubation to obtain descendants.

Both centers RFZ and CFV, as are located in areas where WNV and aspergillosis infections can occur. They will receive >1 year old descendants from new founders/high genetic value.

• **Centro de Cría Guadalentín, CCG** because of its geographical location (1300m. a.s.l.) its function is to receive principally the first descendants from new founders. Further, to become the reference centre for adoption for chicks produced in Spain and during the first summer, to house those descendants of high genetic value accorded to house definitively by one of the two previous SBCs where WNV and aspergillosis infections have already appeared.

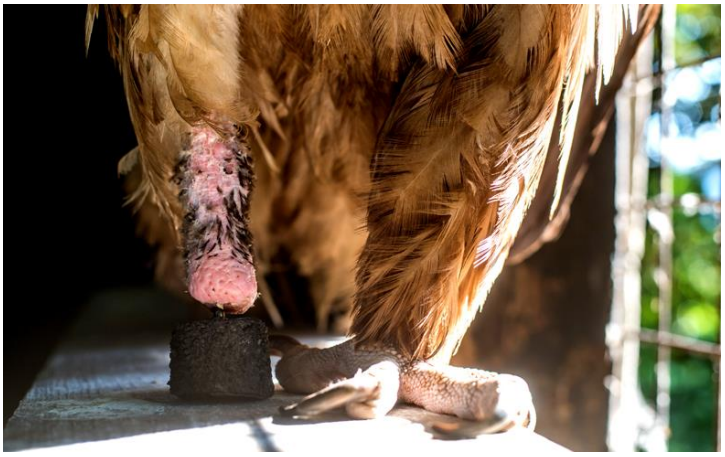
• **Breeding centre Asters and Tierpark Goldau** because of their location in the mountains where the best climatology conditions exist for the species, they will receive principally descendants from new founders, especially from high genetic value. Further, both will become the reference centre for chicks adoption in each country.

OUTLOOK / NEWS

First time that a claw has been amputated and substituted by an implantation with success.

This happened at the RFZ with an immature bird that was transferred last season from Goldau Tierpark (Switzerland) to RFZ for adoption. By the blood sample extraction for sex determination, it was observed that the right claw of this chick was completely mummified (see attached picture). We supposed a wool threat entangled the claw being not able for release. During the winter, first signs of a pododermatitis appeared at the healthy claw being necessary to intervene. The whole intervention was done at the General Hospital from Vienna (AKH) by Dr Rickard Branemark (University Götebor, Sweden) –promoter of this new technic- in collaboration with Dr Oskar Aszmann from the Med. Uni. Vienna and with the anesthetists Attilio Rocchi and Flavia Restitutti from the Veterinarian Uni. of Vienna. All could be done thanks to the personal implication and coordination from the veterinarian Sarah Hochgeschurz collaborator at the RFZ.

This new technique that is still in the experimental phase in humans consists of the implantation of a titanium nail in the bone, which can theoretically support a weight from 50Kg.



After a small post-surgery infection, finally the bird named Mia has perfectly accepted the implantation and is using it as a normal claw, holding the food and scratching with the implanted leg.

Thanks to the good cooperation in the Bearded Vulture EEP, the goal to re-establish an European meta-population is getting closer.

We would like to thank our sponsors:

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ANNEX I

Table 1: EEP stock and its distribution as on 31st December 2018

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
	982	Aachen zoo	Germany		1	/ {410/290}		F2	
1011				4		{203/298} /	F2		Handraised
753	653	Acad. Puy du Fou	France	6	8	{371/103} / {124/041}	F3-F2/F2-F3	F2	
804	801	Alp. Innsbruck	Austria	5	5	{340/338} / {371/103}	F3/F2	F3-F2/F2-F3	
912	889	Amnéville Zoo	France	3	3	{461/483} / {286/153}	F2/F3 / F3/F4 / F3	F1	
454	502	ASTERS	France	14	13	{108/175} / {179/281}	F2/F3 / F2	F2	
700	622			7	9	{286/153} / {371/103}	F1	F3-F2/F2-F3	
860	627			4	9	{500/513} / {371/103}	F1 / F2/F3	F3-F2/F2-F3	
	1010				1	/ {GT099/493}		?/ F2/F3	Feather problems
763	635	Beauval Zoo	France	6	9	{129/481} / {159/270}	F3/F1	F1	
611	634	Beozoo	Serbia	9	9	{199/107} / {034/130}	F1/F2	F1/F2	
298	320	Berlin Zoo	Germany	21	20	{122/108} / {018/272}	F2	F2	
124	329	CC Guadalentín	Spain	29	20	{131/132} / {043/040}	F1	F1	
286	658			29	8	founder / {199/107}	F0	F1/F2	
313	330			20	20	{009/006} / {108/119}	F1/F2	F2-F3/F2	
337	317			20	20	{201/044} / {017/070}	F1/F2	F2	
362	389			19	17	{080/081} / {199/107}	F2	F1/F2	
391	360			17	19	{124/041} / {018/272}	F2	F2	
410	290			16	21	{286/153} / {134/135}	F1	F1	
590	580			10	10	{223/329} / {201/044}	F2/F3	F1/F2	
947	908			2	3	{223/725} / founder	F2/F1	F0	
1006	987			1	1	{681/560} / {500/513}	F1 / F4-F3/F3-F4	F1 / F2/F3	
973				2		{GT099/493} /	?/ F2/F3		Feather problems
	911				3	/ {431/436}		F1 / F3/F2	
	976				1	/ {362/389}		F3 / F2/F3	Cataracts
500	513	CF Torreferrussa	Spain	13	12	founder / {009/006}	F0	F1/F2	
297	115	CF Vallcalent	Spain	21	30	{086/104} / {019/021}	F2	F1	
327	381			20	18	{105/178} / {159/270}	F2/F1	F1	
371	103			18	31	{105/178} / {065/040}	F2/F1	F1/F2	
551	588			11	10	founder / {371/103}	F0	F3-F2/F2-F3	
652	680			10	10	founder / founder	F0	F0	
972				2		founder /	F0		
368				19		{159/270} /	F1		Handraised
340	338	Chomutov Zoo	Czech Rep.	20	20	{018/272} / {134/135}	F2	F1	
846	859	Córdoba Zoo	Spain	4	4	{722/723} / {018/336}	F2	F2 / F2/F3	
826	828	FPWC - CWR	Armenia	?	?	founder / founder	F0	F0	
978				1		{826/828}	F1		sex unknown
979				1		{826/828}	F1		sex unknown
672	576	Frankfurt Zoo	Germany	8	10	{337/317} / {108/175}	F2/F3 / F3	F2/F3 / F2	
788	281	Helsinki Zoo	Finland	5	22	{297/115} / {131/132}	F3/F2	F1	

Bearded Vulture EEP: results for 2018

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
80	130	La Garenne Zoo	Zwitzerland	34	29	{019/021} / {150/151}	F1	F1	
180	274	Liberec Zoo	Czech Rep.	34	33	{161/162} / founder	F1	F0	
654	656			8	8	{108/175} / {180/274}	F2/F3 / F2	F2/F1	
662	668	MónNatura	Spain	8	8	{371/103} / {172/290}	F3/F2 / F2/F3	F2/F3 / F2	
748	832	Moscow Zoo	Rusia	6	4	{108/175} / {180/274}	F2/F3 / F2	F2/F1	
	480	Nikolaev Zoo	Ucraina		18	/ founder		F0	
	726				11	/ founder		F0	
744	657	Novosibirsk Zoo	Rusia	23	8	founder / {223/329}	F0	F2/F3	
1008	1009			20	19	founder / founder	F0	F0	
18	336	Nuremberg Zoo	Germany	40	20	{019/021} / {201/044}	1	F1/F2	
993	896	Oasi Sant' Alessio	Italy	1	3	{199/107} / {399/278}	F1/F2	F2 / F2/F3	
325	322	Ostrava Zoo	Czech Rep.	20	20	{017/070} / {152/153}	F2	F1	
207	233			25	24	{017/070} / {122/118}	F2	F2	
850	747	P. Animalier Pyrénées	France	4	7	{223/725} / {286/153}	F2/F1	F1	
894	598	Parc des Oiseaux	France	3	19	{286/153} / {145/276}	F1	F2 / F2/F3	
664	659	Parc Pairi Daiza	Belgium	8	8	{391/360 / {017/070	F3	F2	
451	469	Parco Natura Viva	Italy	14	14	{108/175} / {018/272}	F2/F3 / F2	F2	
914	903	Plock Zoo	Poland	3	3	{461/483} / {174/118}	F2/F3 / F3/F4 / F3	F2	
328	561	Posen Zoo	Poland	20	11	{080/081} / {313/330}	F1	F2/F3 / F3-F4/F3	
511	519	Prague Zoo	Czech Rep.	12	12	{002/003} / {105/178}	F1	F2/F1	
	135				50	/ founder		F0	
	142				28	/ {009/041}		F1/F2	
234	397	Priv. Montowl	Italy	24	17	{086/104} / {201/044}	F2	F1/F2	
830	620			4	9	{034/130} / {172/290}	F1/F2	F2/F3 / F2	
591	636	Priv. B. Sloman	England	10	10	{080/081} / {722/723}	F1	F2	
461	483	RC Green Balkans	Bulgaria	14	13	{199/107} / {108/175}	F1/F2	F2/F3 / F2	
	956				2	/ {174/118}		F2	
	999				2	/ {340/338}		F3/F2	
17	70	Richard Faust Center	Austria	40	35	{019/021} / {022/023}	F1	F1	
87	6			33	41	{014/010} / {019/020}	F1	F1	
108	175			30	27	{065/040} / {152/153}	F1/F2	F1	
199	107			26	31	founder / {150/151}	F0	F1	
399	278			17	22	{159/270} / {065/074}	F1	F1/F2	
468	453			14	14	{223/132} / {286/153}	F2/F1	F1	
594	547			10	11	{172/290} / {105/178}	F2/F3 / F2	F2/F1	
681	560			10	11	founder / {371/103}	F0	F3-F2/F2-F3	
844	673			4	8	{337/317} / {313/330}	F2/F3 / F3	F2/F3 / F3-F4/F3	
857	835			4	4	{468/453} / {399/278}	F3/F2 / F2	F2 / F2/F3	

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Bearded Vulture EEP: results for 2018

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
847	829	Richard Faust Center	Austria	4	4	{313/330} / {108/175}	F2/F3 / F3-F4/F3	F2/F3 / F2	
212	40			25	39	{152/153} / {034/035}	F1	F1	
	352				19	/ {086/104}		F1	
	518				12	/ {087/054}		F1	
	600				10	/ {159/270}		F1	
	619				9	/ {297/115}		F3/F2	
	892				3	/ {223/725}		F2/F1	
	969				2	/ {145/276}		F2 / F2/F3	
	398				17	/ {159/270}		F1	
977	1007	Riga Zoo	Letonia	1	1	{297/115} / {108/175}	F3/F2	F2/F3 / F2	
201	44	Schönbrunn Zoo	Austria	31	39	founder / {002/003}	F0	F1	
431	436	Tallinn Zoo	Estonia	19	15	founder / {180/274}	F0	F2/F1	
294	292	Tier. Friedrichsfelde	Germany	21	21	{017070} / {199/107}	F1	F1/F2	
437	503			15	13	{180/274} / {294/292}	F2/F1	F3 / F2/F3	
174	118	Tierpark Goldau	Zwitzerland	27	30	{134/135} / {154/155}	F1	F1	
60	91			36	33	{034/035} / {005/006}	F1	F2	
145	276			28	22	{131/132} / {199/107}	F1	F1/F2	
	209	Walsrode	Germany		25	/ {150/151}		F1	
789	456	ZooBotánico Jerez	Spain	5	14	{180/274} / {286/153}	F2/F1	F1	

Table 2: Age distribution of bearded vultures within the EEP as on 31st December 2018

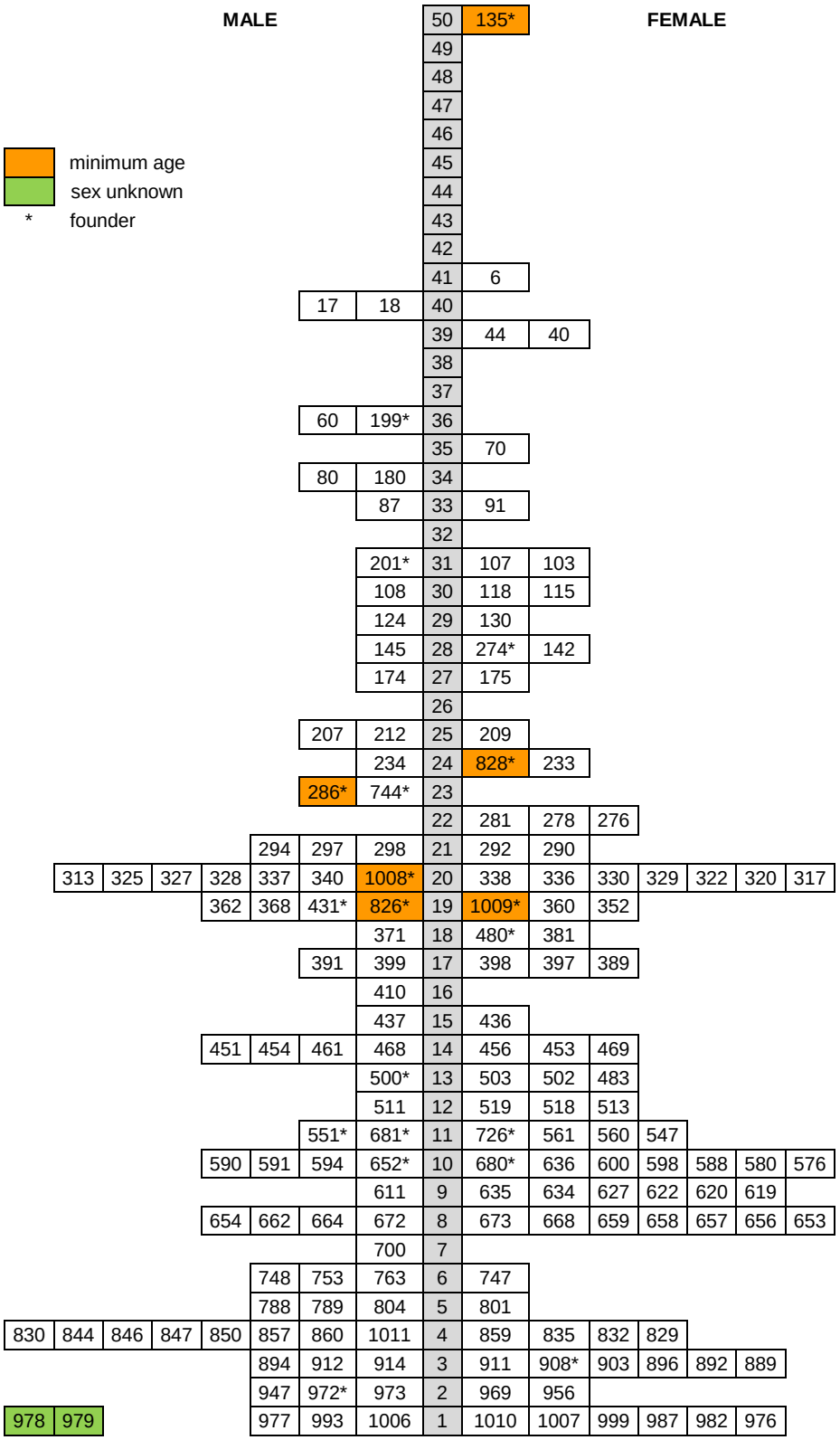

Table 3: Breeding pairs and their results in 2018

COUNTRY	PAIR	LAY DATE	HATCH DATE
ARMENIA			
Yerevan zoo	BG 828 x BG 826	1st: ?11th Dec 2nd: ?14th Dec	30th Jan 05th Feb
AUSTRIA			
Tiergarten Schönbrunn	BG 201 x BG 044002003	1st: ?	Broken 03rd Feb
Richard Faust Zentrum	BG 108065040 x BG 175152153	1st: 26th Nov 2nd: ?01st Dec 3rd: 02nd Mar	Broken 25th Jan 23rd Apr
	BG 017019021 x BG 070022023	1st: 26th Dec 2nd: ? Jan	16th Feb 23rd Feb
	BG 199 x BG 107150151	1st: 01st Jan 2nd: 11th Feb	25th Feb Infertile
	BG 087014010 x BG 006019020	1st: 30th Dec	Broken
	BG 399159270 x BG 278065074	1st: 26th Nov 2nd: 03rd Jan	Broken Broken
	BG 681 x BG 560371103	1st: 05th feb 2nd: 12th Feb	31st Mar (died 11th Apr) 06rd Apr
	BG 080019021 x BG 040034035	1st: 27th Dec 2nd: 05th Jan	Broken 29th Dec Aborted (last incubation week)
	BG 594172290 x BG453286153	1st: 22nd Jan	Broken 23rd Jan
BULGARIA			
Rescue Center Green Balkans	BG 461199107 x BG 483108175	1st: 01st Jan 2nd: 09th Jan	22nd Feb 02nd Mar (died 21 days old)
ENGLAND			
Private Center	BG 722154155 x BG 723154155	-	
ESTONIA			
Tallinn Zoo	BG 431 x BG 436180274	1st: 20st Jan	Aborted 13th Mar
FRANCE			
Beauval Zoo	BG 763129482 x 635159270	1st: ?6th Mar 2nd: ?12th Mar	Infertile Infertile
FINLAND			
Helsinki Zoo	BG 788297115 x BG 281131132	1st: 16th Feb	Broken/infertile
GERMANY			
Tierpark Friedrichsfelde Berlin	BG 294017070 x BG 292199107	1st: 16th Jan	Infertile

		2nd: ? Jan	16th-17th Mar
	BG 437180274 x BG 503294292	1st: 31st Jan	26th Mar (died hatching day)
Berlin Zoo	BG 298122118 x BG 320018272	-	
Nuremberg Zoo	BG 018019021 x BG 336201044	1st: 29th Jan	Infertile
ITALY			
Center Monticello (M. Albertini)	BG 234086104 x BG 397201044	1st: 12th Jan	Aborted (around 4th week)
Parco Natura Viva	BG 451108175 x BG 469018272	1st: 09th Jan	Broken
LATVIA			
Riga Zoo	BG 327105178 x BG 381159270	1st: 1st-2nd Jan	Broken/infertile 25th Feb
SERBIA			
Belgrade Zoo	BG 611199197 x BG 634034130	1st: 07th Feb	Broken/fertile 11th Mar
SPAIN			
Centro de Cría Guadalentín	BG 286 x BG 153	1st: 17th Dec 2nd: 21st Dec 3rd: 28th Dec	Infertile Broken 02nd Feb Infertile
	BG 313009006 x BG 330108119	1st: 01st Jan 2nd: 07th Jan	14th Feb Putrefied
	BG 391124041 x BG 360018272	1st: 02nd Jan 2nd: 12th Jan	24th Feb 05th Mar
	BG 337201044 x BG 317017070	1st: 19th Dec 2nd: 25th Dec	09th Feb 16th Feb
	BG 362080081 x BG 389199107	1st: 02nd Dec	26th Jan
	BG 410286153 x BG 290134135	1st: 17th Dec 2nd: 24th Dec	08th Feb Putrefied
	BG 124131132 x BG329043040	1st: 04th Dec 2nd: 25th Jan	Broken 25th Dec 17th Mar
Centre de Fauna Vallcalent	BG 371105178 x BG 103065040	1st: 07th Jan 2nd: 19th Jan 3rd: 29th Jan	02nd Mar (08th Mar died) 14th Mar 22th Mar
	BG 652 x BG 680	1st: 25th Jan	Broken/fertile 18th Feb
	BG 297086104 x BG 115019021	1st: 07-08th Dec 2nd: 15th Dec 3rd: 20th Jan	31th Jan 05th Feb Infertile
Centre de Fauna Torreferrussa	BG 500 x BG 513009006	1st: 23rd Dec	17th Feb Infertile

		2nd: 29th Dec	20th Feb
SWITZERLAND			
Breeding Centre Goldau/Rigi	BG 174134135 x 118154155	1st: 30th Dec	Brocken 18th Feb
	BG 060034035 x BG 091005006	-	
	BG 145131132 x BG 276199107	1st: 14th Jan	08th Mar
La Garenne	BG 212152153 x BG 130150151	1st: 16th Jan 2nd: 28nd Jan	Broken/Infertile 17th Mar Broken/Infertile 17th Mar
TS-REPUBLIC			
Liberec Zoo	BG 180161162 x BG 274	1st: 10th Dec 2nd: 16th Dec	Aborted 03rd Jan 08th Feb (17th Mar died)
	BG 654108175 x BG 656180274	1st: 24th Jan	Aborted 10th Mar
Chomutov Zoo	BG 340018272 x BG 338134135	1st: 10th Jan	06th Mar
Ostrava Zoo	BG 207017070 x BG 233122118	1st: 25st Dec	16nd Feb (died during hatching)
	BG 325017070 x BG 322152153	1st: 27th Dec 2nd: 04Th Jan	Aborted (week before hatching) 27th Feb (02nd Mar died)
Prague Zoo	BG 134 x BG 142009041	1st: 19th Jan	Aborted 19th-20th Feb
Private Mr. Stika*	BG 470159270 x BG 303009006	1st: 26th Dec 2nd: ?2nd Jan	Aborted (just before hatching) 22nd Feb

* In July excluded from the EEP.

Table 4. Destination Offspring in 2018

STUDBOOK	PARENTAGE	SEX	BREEDING	DESTINATION
BG 975	BG 108 x BG 175	m	Richard-Faust-Zentrum	RELEASE (Léoux Valley, Baronnies, FRANCE)
BG 976	BG 362 x BG 389	f	Richard-Faust-Zentrum	**BREEDING** (Centro de cría Guadalentín)
BG 977	BG 297 x BG 115	m	CF Vallcalent	**BREEDING** (Riga Zoo)
BG 978	BG 826 x BG 828	?	FPWC	**BREEDING** (Destination:?)
BG 979	BG 826 x BG 828	?	FPWC	**BREEDING** (Destination:?)
BG 980	BG 297 x BG 115	m	CF Vallcalent	RELEASE (Léoux Valley, Baronnies, FRANCE)
BG 981 1)	BG 180 x BG 274		Liberec zoo	DIED
BG 982	BG 410 x BG 290	f	CC Guadalentín	**BREEDING** (Aachen Zoo)
BG 983	BG 337 x BG 317	m	CC Guadalentín	RELEASE (Léoux Valley, Baronnies, FRANCE)
BG 984	BG 017 x BG 070	m	Richard-Faust-Zentrum	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 985	BG 337 x BG 317	f	CC Guadalentín	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 986 2)	BG 207 x BG 233		Ostrava zoo	DIED
BG 987	BG 500 x BG 513	f	CF Torreferrussa	**BREEDING** (Centro de cría Guadalentín)
BG 988	BG 461 x BG 483	m	Green Balkans	RELEASE (P.N. Castril, Andalusia, SPAIN)
BG 989	BG 470 x BG 303	f	Priv. Petr Stika	**NO EEP**
BG 990	BG 313 x BG 330	f	CC Guadalentín	RELEASE (P.N. Castril, Andalusia, SPAIN)
BG 991	BG 017 x BG 070	m	Richard-Faust-Zentrum	RELEASE (P.N. Hohe Tauern, Seebachtal, AUSTRIA)
BG 992	BG 391 x BG 360	m	CC Guadalentín	RELEASE (P.N. Tinença, Valencia, SPAIN)
BG 993	BG 199 x BG 107	m	Richard-Faust-Zentrum	**BREEDING** (Oasi di Sant' Alessio)
BG 994 3)	BG 325 x BG 322		Ostrava	DIED
BG 995	BG 313 x BG 330	m	CC Guadalentín	RELEASE (P.N. Tinença, Valencia, SPAIN)
BG 996 4)	BG 371 x BG 103		CF Vallcalent	DIED
BG 997 5)	BG 461 x BG 483		Green Balkans	DIED
BG 998	BG 391 x BG 360	m	CC Guadalentín	RELEASE (P.N. Hohe Tauern, Seebachtal, AUSTRIA)
BG 999	BG 340 x BG 338	f	Chomutov zoo	**BREEDING** (Green Balkans, Bulgaria)
BG 1000 6)	BG 145 x BG 276		Tierpark Goldau	DIED
BG 1001	BG 371 x BG 103	m	CF Vallcalent	RELEASE (Melchsee-Frutt, SWITZERLAND)
BG 1002 7)	BG 124 x BG 329		CC Guadalentín	DIED
BG 1003	BG 371 x BG 103	f	CF Vallcalent	RELEASE (Melchsee-Frutt, SWITZERLAND)
BG 1004 8))	BG 437 x BG 503		Tierpark Friedrichsfelde	DIED
BG 1005 9)	BG 681 x BG 560		Richard-Faust-Zentrum	DIED
BG 1006	BG 681 x BG 560	m	Richard-Faust-Zentrum	**BREEDING** (Centro de cría Guadalentín)
BG 1007	BG 108 x BG 175	f	Richard-Faust-Zentrum	**BREEDING** (Riga Zoo)

1) died with an age from 37 days: four days after blood extraction for sex determination.
2) died during hatching in the nest.
3) died with an age from 3 days: yolk sack infection.
4) died with an age from 6 days: killed by foster female as food for the older chick on the 2nd adoption day.
5) died with an age from 21 days.
6) died as fledgling because collision with aviary structure.
7) died with an age from 11 days: killed by foster male during feeding the chick on the 2nd adoption day.
8) died during hatching in the nest.
9) died with an age from 11 days. Suspicion male killed it because was no more incubating during the adoption.