Bearded Vulture European Endangered Species Programme (EEP): Annual report 2019

By Dr. Alex Llopis Dell

Centre de Fauna Vallcalent, Ptda. Vallcalent 63, 25199 Lleida, Spain.
Phone number +34 657 47 3378 a.llopis@4vultures.org Skype address: alexllopisdell

SUMMARY

In 2019 a record of produced nestlings could be achieved: 30 fledglings. 42 Bearded Vulture laying pairs (two foster pairs are included) laid 67 eggs, from which 36 hatched and 30 survived. Unfortunately, a chick died as a fledgling after abandoning the nest because of an accident. From the remaining 29 birds, 18 came from the specialized captive breeding centres (18 breeding pairs), and 11 from Zoos (22 breeding pairs).

We also achieved a new record of released birds. We provided 22 Bearded Vultures for release to all 4 on-going reintroduction projects (Andalusia, all three release of the GypConnect LIFE project, Corsica and Maestrazgo).

Three new pairs (Liberec, T. Friedrichsfelde and Parco Natura Viva zoos) started to reproduce, one pair (Belgrade zoo) produced its first hatchling which died during the adoption, four new pairs (Alpenzoo, Asters, Novosibirsk and Prague zoos) produced their first clutch and finally seven more pairs started to mate or nest building (CF Vallcalent, CC Guadalentín, 2 pairs in Asters, Académie de Fauconnerie du Puy du Fou, and La Garenne and Frankfurt zoos).

Thanks to the close cooperation between Tallinn zoo, Richard Faust Zentrum, Air Nordica, EAZA and VCF it was possible to do an exception and transfer both chicks from Estonia to Austria by plain for their adoption.

11 birds, from the 14 previewed, have been transferred during 2019, making it possible to establish six new pairs and one foster pair.

Successful surgery achieved by AMUS recovery centre could be done by a wild immature bird, recovering the functionality of one of its legs.

For the first time, a double clutch could be transferred successfully by ferry and car from Corsica to Vallcalent within the project for the ex-situ conservation of the genetic heritage of the Corsican Bearded Vulture population.

In 2019, two adult females and one juvenile male less than five months old died.

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 2019 - we thank you for your support, without this the future of the Bearded Vulture in Europe would look bleaker!

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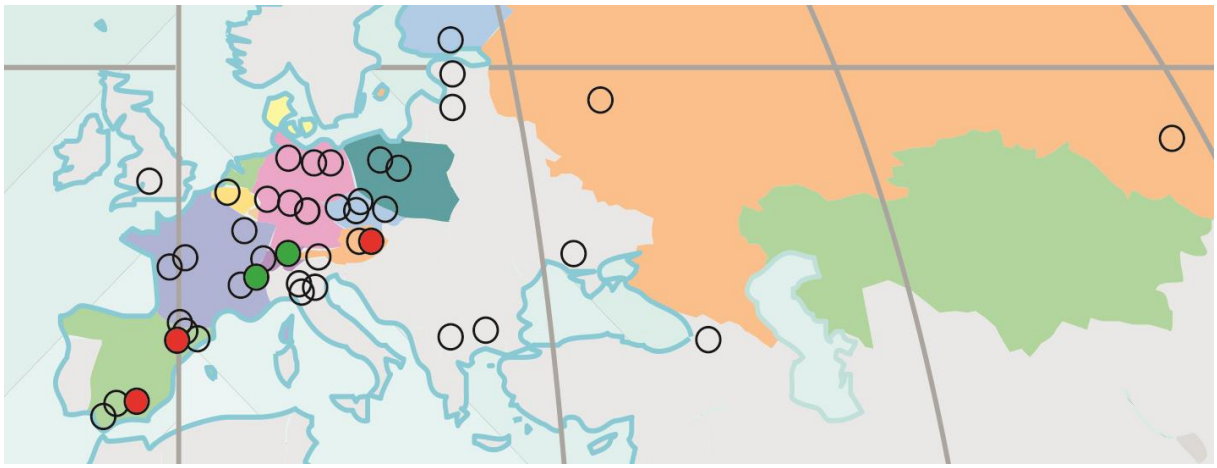
INTRODUCTION

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 2019, the EEP included 34 zoos (mainly European), 3 large (red spots) and 2 smaller (green spots) specialized captive breeding centres, 2 recovery centres and 2 private keepers, keeping a total of 178 birds. The VCF owns 87% of these. From these 178 birds, 83 are males with an average age of 13.9 years old (range from 41 years to 1 year old) and 94 females with an average of 13.4 years old (range from 42 years to 1 year old). Additionally, the sex of one descendant 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 2019).

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, 560 juveniles were reared successfully as part of the programme, creating the possibility to broaden the initial goals and continue with the new reintroduction project that started a year ago in Maestrazgo (Spain). The reared offspring have been used for reintroduction projects in Europe: in the Alps (227), Andalucía (63), Grands Causses (20), Sardinia (3), Corsica (6), Maestrazgo (4) and for the captive breeding network (237).

BREEDING RESULTS 2019

In 2019 we were finally able to break the stable production of around 25 chicks per year and achieve a new record, breaking the 30 chick's barrier from 42 laying pairs, which laid 67 eggs. Additionally, six chicks died because of various reasons. Three chicks died because of hatching problems. One, was too big, being not able to rotate, and malpositioned, having one foot under the chick's head. The other two died after receiving human help, being necessary to remove them from the eggshell. One was too weak and the second its yolk sack was still not 100% absorbed. The fourth showed having hatching problems, being necessary to remove the egg from the nest. Three days later, it was returned to the nest and was mortally wounded by the female, dying a few hours later. And the last two hatchlings died in the nest. One died a day after hatching and the second at five days old, when suddenly one of the adults took the chick to the edge of the nest, which died because of cooling.

Unfortunately, from the 30 survived nestlings one chick died as a fledgling after abandoning the nest because of an accident. Finally, of the remaining 29 birds, 18 came from the specialized captive breeding centres (18 breeding pairs), and 11 from Zoos (22 breeding pairs).

Thanks to this new record of chick's production it was possible to establish an additional record of released birds. 22 nestlings could be offered to the five on-going reintroduction projects (Alps, Andalusia, Grands Causses, Corsica and Maestrazgo). Nine of these 22 nestlings were used for the LIFE project GypConnect, nine for Andalusia, two for Corsica and two for Maestrazgo.


EGS Archiv

Specialized captive breeding centres

- Richard Faust Bartgeier Zuchtzentrum (RFZ) - Eulen- und Greifvogelstation Haringsee (EGS).

The RFZ, headquarters of the EEP and with a captive stock of 31 birds at the end of 2018, is specialized in the reproduction of founder birds. At the RFZ seven

pairs laid in the breeding season 2018/19. 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. And the last is a young pair composed by a founder male and a captive bred female. From this last pair a second chick could be obtained and included in the EEP.

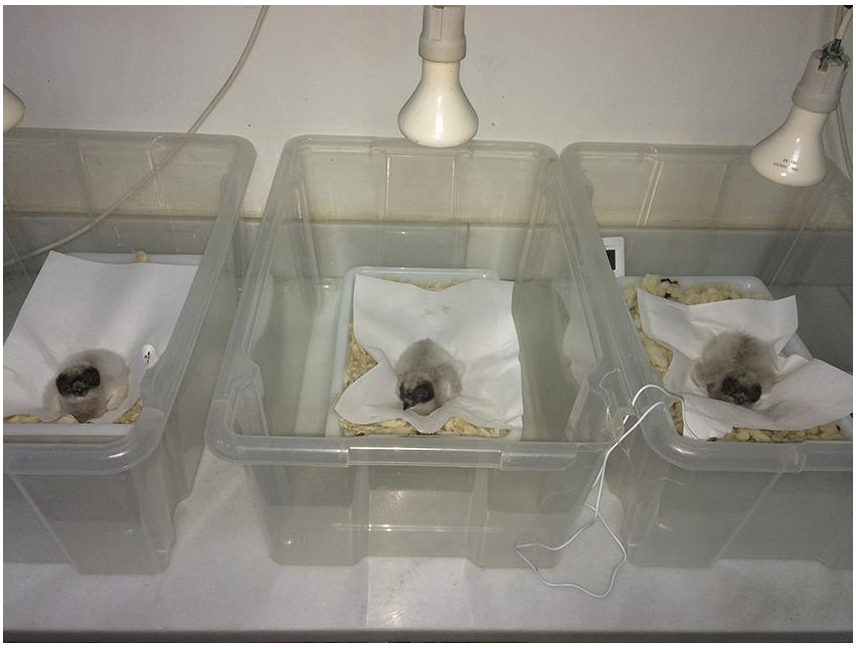
All together, they produced 10 eggs (six were fertile) and from them, six chicks hatched and all survived. One chick was removed from the nest the day after hatching because it was too weak. After three days of hand-rearing it was successfully adopted.

One of the old breeding facilities from Richard Faust Centre where all began.

Further, two new young pair bonding were tried. One pair could be observed mating and nest building since middle January, but in the 23rd of February it was necessary to remove definitively the male because of heavy fights coming from the female. For the second, the male showed again copula behavioural alterations, mating the perches near the female, and it was also necessary to interrupt pair bonding.

From the six nestlings (5 males and 1 female), four have been released (one in Vercors and one in Grands Causses - framework of LIFE project GypConnect-, one in Andalusia and one in Corsica) and the other two have been included in the EEP (two males).

- Centro de Cría de Guadalentín (CCG)



The CCG, with a captive stock of 23 birds at the end of 2018, is the basis of the Andalusia Bearded Vulture reintroduction project. On the 10th of December, the 45 years old founder female BG153 died, being necessary to try pair bonding of her male with a younger female in the middle of the breeding season. At the end of December, the first mating attempts could be observed. Unfortunately, mating success didn't arrive during this season. Finally, six breeding pairs laid 13 eggs, from which 11 were fertile. Unfortunately, four eggs aborted in different incubation stage. Two of them in the middle of the incubation, one just before pecking the air cell and the last were malpositioned. The remaining seven fertile eggs hatched and all chicks survived (3 males and 4 females).

All seven nestlings (3 males and 4 females) have been used for reintroduction projects (3 in Grands Causses and 1 in Vercors in the framework LIFE project GypConnect, 2 in Andalusia and 1 in Maestrazgo).

Further, Guadalentín as a centre specialized in double, triple and quadruple adoptions, four additional hatchlings have been successfully adopted. Two came from Centre de Fauna Vallcalent and two from the wild clutch extracted in Corsica and hatched in Vallcalent. Both chicks from Vallcalent have been released (1 in Andalusia and 1 in Maestrazgo). The two chicks from Corsica have been included in the EEP within the project for the ex-situ conservation of the genetic heritage of the Corsican Bearded Vulture population.

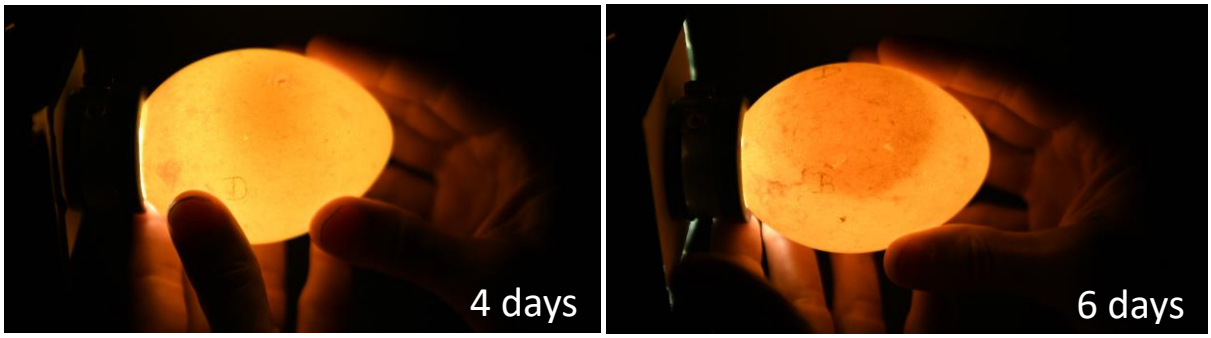
The Guadalentín Breeding Centre specialized on double, triple and quadruple adoptions (Andalusia, 2015).

- 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, 12 birds were housed in CFV facilities (four of them are from the Pyrenees). Three pairs laid nine eggs, from which five were fertile and four chicks hatched. Unfortunately, the fourth egg of one of those pairs, the chick died just before pecking the eggshell. The chick aspirated his own faeces.

As in previous seasons the seven laid eggs from the two experienced females with incubation problems have been removed from their nest almost since the laying day and incubated artificially. Thanks to daily candling, infertile or aborted eggs are discarded as soon are detected avoiding the contamination of fertile eggs. Two from seven showed to be infertile and were immediately removed from the incubator. **By candling fertile eggs it has been observed that the shadow of the yolk has doubled its size when it has six days of incubation**.



From the four chicks produced, only one needed human help. On the 4th of March, the chick pecked eggshell at 21:00. 24 hours later it was necessary to remove the pecked eggshell, because the chick was already chirping with less intensity. The chick immediately started to chirp more strongly and the eggshell-hole was covered with gauze soaked with Betadine. On the 6th of March during the day eggshell pieces were removed several times to the still vascularized area and each time covered with gauze soaked with Betadine. On the 7th at 7:40 the chick already hatched.

Chick BG 1036 receiving special hatch assistance (Centre de Fauna Vallcalent, Lleida, Spain).

Only one of the four hatched chicks were reared at Vallcalent. The chick from Torreferrussa was transferred and adopted in Vallcalent, because of its valuable genetic (50% from the Pyrenees) and his parents have not enough experience on chick rearing. In return the pair from Torreferrussa received the second chick from Vallcalent to gain experience. The remaining two chicks were transferred to Guadalentín for their adoption.

On the 14th of March a double clutch removed on the 11th of March in Corsica (Bonifatu Territorium) arrived at Vallcalent for artificial incubation. Both eggs hatched and after one week of hand-rearing they were transferred to Guadalentín for their adoption (see chapter Transfer/Increases/Loses).

Again the human imprinted male “Kazajo” was stimulated by their human keeper and used as foster male. He could rear the first hatched chick at Vallcalent Breeding Center.

The third laying pair coming from Riga zoo, thanks to observation, it was possible to determine why their clutches have always been infertile in the zoo. The male is not able to mate the female, copulating on the perches next to the female. It will be necessary to exchange female.

All four chicks (1 male and 3 females) have been released (1 in Grands Causses -framework LIFE project GypConnect-, 2 in Andalusia and 1 in Maestrazgo). The two chicks that have hatched from the removed double clutch of Corsica have been included in the EEP.

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

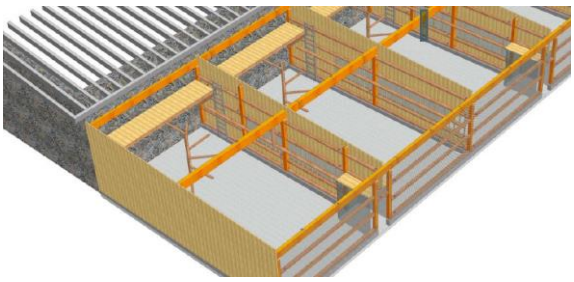
Asters centre located at 700m a.s.l. in Sallanches (near Montblanc, France), giving the best climatology conditions for the species, has the function to house birds from less common blood lines inside the EEP. At the end of 2018 housed seven birds. The pair BG454 x BG502 formed in the previous cycle at Vallcalent, laid for the first time a single clutch. Unfortunately, the egg was infertile. A second young pair, end of January both specimens can be observed rebuilding the nest, but always separately (see picture right). At the end of the breeding season the second young pair also showed first signs of interest for the nest.

- Bearded Vulture Breeding Center in Natur und Tierpark Goldau

This small breeding centre in Arth-Goldau houses three breeding pairs. All three together laid four fertile eggs. Three of them hatched and only one survived. On the 13th of March suddenly one of the adults birds BG 145 x BG 276 took the five days old chick to the edge of the nest, where it died because of cooling. And on the 16th of June a 4 months old descendant from breeding pair BG 174 x BG 118 died just after fledging. He collided with the infrastructure of the aviary and was found drowned in the drinking bowl. It is the second and consecutive year that it happened to this pair.

The survived nestling was a female and released in Andalusia.

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 laying pairs (included two foster pairs) in the specialized captive breeding centres laid 37 eggs (2 eggs from 2 foster pairs included). From these 37 eggs, 20 chicks hatched and 19 fledged. Furthermore, one bird died as fledgling. From the 18 survived fledglings (9 males and 9 females) 16

have been released (5 in Grands Causses and 2 in Vercors -framework LIFE project GypConnect-, 6 in Andalusia, 1 in Corsica and 2 in Maestrazgo) and 2 males kept for the EEP. Additionally, one new pair produced its first clutch, and another pair was observed mating for the first time.

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 2019 breeding season zoos and recovery centres (Tierpark Friedrichsfelde Berlin, Nuremberg, Parco Natura Viva, Ostrava and Chomutov zoos had respectively 1 chick, Tallinn and Liberec zoo 2 chicks each, and the recovery centres Torreferrussa and Green Balkans 1 chick respectively) produced 11 fledglings (4 males and 7 females). The young pairs in Tierpark Friedrichsfelde Berlin and Liberec zoo, and the breeding pair from Parco Natura Viva produced in 2019 their first fledgling.

2 days old chick from Chomutov zoo being fed by its mother (Czech Republic).

Unfortunately, five hatchlings died at different nestling stages:

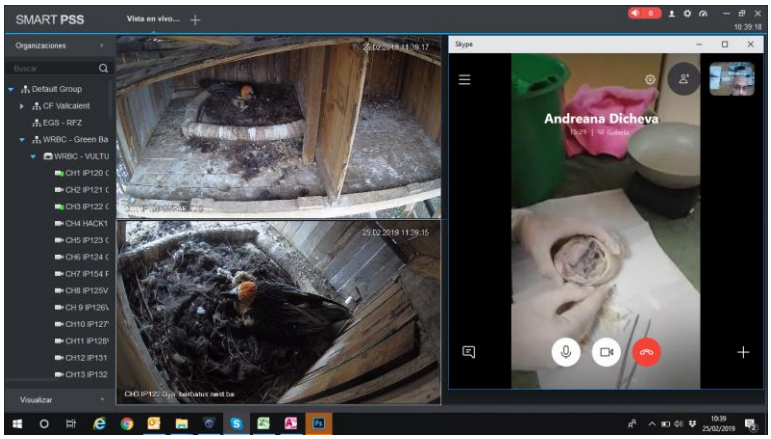
1. The chick from the old breeding pair of Liberec zoo died during hatching. It was too big, being not able to rotate and furthermore one foot was under its head.
2. At the Bear Rescue Center from the FPWC foundation the breeding male throw the chick out of the nest the day after hatching. Immediately the staff went to the nest but the chick was already dead.
3. The second egg from the Bear Rescue Center had already a big hole, showing that the chick had hatching problems. The chick needed assisted hatching, but unfortunately it died during the night in the laboratory.

4. Also, the first chick from the old pair of Ostrava zoo had hatching problems and needed help. The day after pecking the eggshell the chick started to breathe heavily with its beak open. It was necessary to make a round on the eggshell and breathing got better. But after a while it got worse again, being necessary to open the whole air cell end and extract the chick. The chick was completely swollen and it was breathing hard. Further, the yolk sack was not 100% absorbed. The day after in the morning the umbilical cord was separated with the remains of the egg. Even though the chicken died during the night.

Assisted hatching by the first chick of the old breeding pair from Ostrava zoo. Unfortunately the yolk sack was not absorbed and died in the following night (Czech Republic).

5. And as mentioned above, the chick from Belgrade zoo died during the adoption. It was the chick from the 1st egg of a double clutch which had hatching problems being necessary to remove it from the nest for assisted hatching in the nursery. By the adoption the female reacted aggressively and hurt him mortally.

This year again, it was necessary to help the Green Balkans team with artificial hatching and chick rearing process. The chick from the single clutch had hatching problems being necessary to remove the egg from the nest and do assisted hatch in the nursery. 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.



Similar was it in Parco Natura Viva. The egg had to be removed just before hatching, because the adults started to fight in the nest. The chick had already pecked the air cell and was chirping in it. The hand-rearing process of the chick was done under daily supervision of the EEP coordinator as well the adoption, removing previously the male. The chick could be successful reared by the female alone.

The pairs in Beauval, Zoo Berlin, Helsinki, Schönbrunn, the old breeding pair from Tierpark Berlin, and the young pair from Ostrava zoos failed to produce a young. Nevertheless, the pairs from Alpenzoo Innsbruck,

Novosibirsk and the second pair from Prague zoo produced a clutch for the first time, and we hope that in the coming seasons we will get descendants from them.

Furthermore, mating was observed for the first time by the pair from Académie de Fauconnerie du Puy du Fou and La Garenne zoo. Unfortunately, the female from la Garenne zoo died a week after being observed her first mating because of a gastric ulcer.

Although existing restrictions on animals, specially Falconiformes, transport in airplane cabin, the two chicks from Tallinn zoo could be successful transferred by plain to Richard Faust Center for their adoption. This was only possible thanks to the special involvement from our colleagues at the European Aquaria and Zoo Association (EAZA) William van Lint and Tomasz Rusek who helped us to contact Jaanus Nuut from Estonian airline LOT/Nordica. He understood our predicament and makes possible that on the 6th of April the pair of young chicks, along with their keeper Jelena Semjonova, left Estonia heading to Austria. Instead of the 18 hour drive the journey took just over four hours from the zoo to the Austrian Breeding Centre and both chicks arrived safely after their travel. The importance of these chicks is that their father is a founder bird and from him there is only one descendant included in the EEP.

☞ **Summary** 21 breeding pairs in the zoos laid 29 eggs. From the 29 eggs, 16 hatched and 11 offspring were successfully reared. From the 11 survived chicks (4 males and 7 females), six have been released

(2 in Baronnies, 3 in Andalusia and 1 in Corsica). The other five (2 males and 3 females) have been kept for the EEP. Additionally, three new pairs produced their first clutch and for two pairs first time mating was observed.

- Private collections:

Only one pair from Monticello (Italy) private collection laid a clutch. Since 2012, when the first clutch was laid, only in 2015 there were indications that a hatching in the nest. That's why it was decided to remove the single clutch immediately after being laid for artificial incubation. Unfortunately, the egg aborted.

In conclusion in 2019, 42 laying pairs (two foster pairs are included) produced 67 eggs, from which 30 chicks survived from the 36 hatchlings (see Table 3 in Annex - Breeding pairs in 2019). Unfortunately, one nestling died just after fledging. From the remaining 29 nestlings, 22 have been released, and 7 were added to the breeding network. Furthermore, a double clutch removed from a wild Corsican pair, could be successfully transferred to Vallcalent, where two chicks hatched and have been adopted in Guadalentín breeding centre (see Table 4 in Annex – Offspring in 2019).

From the 31 not hatched eggs four broke unknowing the real status and 18 were removed infertile from the nest. Only nine fertile eggs didn't hatch. Four of them aborted around the middle and one in the last incubation stage. Two eggs aborted just before pecking the air, two were malpositioned and in one of them the chick aspirated his own faeces.

Release site Maestrazgo reintroduction project (Spain, 2019). Between 1986 and 2019, 323 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 number of chicks produced per year to satisfy 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 of 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 2019, 11 birds from the 14 previewed transfers have been successful transferred (six males and five females) between 6 institutions with the goal to build six new breeding pairs and one foster pair.

During the release in Vercors on the 18th of May, where the team from Schönbrunn Zoo transported a chick from Richard Faust Centre (RFZ) and the team from Vallcalent transported a chick from Guadalentín to Vercors, a female exchange was done between CF Vallcalent and RFZ. Vallcalent received the female BG398 (2002) on the 19th to pair with the male BG327, hoping that he will be able to copulate successfully and not on the perch as he did with the female BG381 (2001). This female arrived on the 19Th at RFZ to try pair bonding with the younger male BG468.

During the same trip back from Vercors to Vallcalent, *"Marty Mc Fly"* -the recovered wild female BG1010 in 2018 from Haute Savoie breeding pair- was transferred from Asters breeding centre to Vallcalent. "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 5th on June "Marty McFly" was definitively sent to CC Guadalentín with the goal to build a foster pair with "Gyphelp".

On the 22nd of May RFZ received the imprinted male BG1011 from Aachen zoo. In return the zoo received on the 24th of July the young male BG1024 (2019), hatched in Torreferrussa and reared in Vallcalent, with the goal to try pair bonding with the one year older female BG982.

"Marty Mc Fly", after been recovered by the team from Asters Breeding center.

For the release in Grands Causses on the 5th of June, again a chick from RFZ was transported by road by the team from Schönbrunn Zoo. During this transport, a bird exchange between La Garenne zoo and RFZ was done. La Garenne zoo received on the 6Th of June a young pair BG847 x BG829 both from 2015. In return RFZ received the old breeding male BG080 (1985) housed in la Garenne, which had lost her female during the breeding season, with the goal to build a new pair with the female BG518 (2007).

On the 1st of August, the Green Balkans recovery centre received two young males from 2019 for the two alone staying females. They received the male BG1034 from RFZ to be paired with the female BG999 (2018), a descendant from Chomutov zoo, and the male BG1035, the first descendant from the young pair of Liberec zoo, for pair bonding with the two years older female BG956 from Tierpark Goldau.

And the last transfer was done on the 16th of October just as the new breeding season began. The young female from Liberec zoo BG1020 was transferred to RFZ waiting to receive next year a male.

Increases:

During 2019, additionally to the seven young descendants coming from the EEP, one recovered released bird in Andalusia, both chicks from the wild recovered clutch in Corsica and one wild recovered adult Pyrenean male have been additionally included in the captive network. In total 11 birds have been included in the EEP (6 males and 5 females).

Continuing with the activities established in the Emergency Plan to save the native bearded vulture population in Corsica, a double clutch was harvested from the wild and transferred by ferry and car to Vallcalent for artificial incubation and first week hand-rearing. Afterwards both chicks were transferred to Guadalentín for their adoption. The VCF, together with the Parc Naturel Régional de Corse, created a five-year emergency action plan, which is included in the French National Action Plan for the Bearded Vulture. This emergency plan includes the project for the ex-situ conservation of the genetic heritage of the Corsican Bearded Vulture population with the goal to guarantee the genetic pool in long term. It consists the recovery of clutches from the wild and the potential hatchlings to include in the EEP. On the 11th of March Park Gardens from the Parc Naturel Régional de Corse could be removed a double clutch from the Corsican wild population (Bonifatu Territorium). On the 14th of March the clutch after 24 hours travel arrived to Vallcalent. The eggs showed to be fertile but extremely small: 1st egg size 8.0 x 6.425cm and 153g weight, and 2nd egg size 7.61 x 6.13cm and 131.5g weight.

From both eggs a chick hatched. BG1045 hatched on the 23rd of March with a weight from 118.7g and BG1050 hatched on the 28th of March with a weight 92.8g. The first chick had hatching problems (lack of oxygen) being necessary to make a hole in the egg-shell during the hatching process. The second chick suffered a yolk sack infection, and started vomiting in the night from the 1st of April. During 6 days, the chick was intensively treated with Antibiotics combination (1st three days Enrofloxacine 10mg/Kg 2x/day + Amoxiciline 125mg/Kg 2x/day; following three days Clindamicine 100mg/Kg 2x/day + Amoxiciline 125mg/Kg 2x/day). It is the first time that a chick with a yolk sack infection could be treated successfully. The 1st chick, BG1045 was transferred to Guadalentín on the 27th of March, and the second, BG1050, on the 9th of April. Both chicks could be reared with success at the breeding center of Guadalentín.

On the 18th of July a wild Pyrenean male, named Isaac, was recovered by Environment Agents in Montseny mountain chain (Catalonia) and transferred to Torreferrusa. The bird showed an osteomyelitis with osteolytic process on the left metatarsus-phalanx joint. His weigh was only 3200g. After several sessions of intensive Antibiotic treatment, the infection could be controlled and on the 11th of October with a weight from 4910g was transferred to CF Vallcalent for its evaluation. The bird is using the left leg but there is no more articulation between the third and fourth phalanx, so its use involves a danger of a recurrent mechanic inflammation. It was suggested to implant a prosthetics as it was already done last year by a juvenile bird in Richard Faust Centre with success. The bird was captured on the 25th of November 2010 as adult and tagged with a GPS.

On the 18th of August the juvenile female BG1028, named “Verdi” and released in Andalusia, was found weak near Albacete. The cause of her weakness could not be determined. Nevertheless because of multiple broken

tail feathers, having a negative impact on her flight condition, it was decided not to release and include her in the captive breeding stock.

Losses:

Only three birds died in 2019, one female at La Garenne zoo (Switzerland), one founder female at Prague zoo (Czech Republic) and one fledgling male at the Tierpark Goldau (Switzerland).

Female died on the 12th of January when on the 5th first mating was observed (La Garenne zoo).

On the 12th of January, the 30 years old female BG130 died at La Garenne zoo because of a Gastric ulcer. This female born in 1990 in Tierpark Friedrichsfelde, arrived in 1995 at La Garenne and paired with the old founder male BG034. Between 1998 and 2015, when the male died, together they produced 12 chicks, being most of them released in the wild. The following two breeding season breeding attempt with the male BG212 were tried without success. Although pair bonding could be observed, the male was not able to mate the female. In 2018 male exchange occurred and started to mate, but unfortunately she died before egg laying occurred, a week after they started mating.

On the 8th of February, the more than 49 years old founder female BG135 died because of a West Nile Virus infection. In March 1971 this female arrived as a juvenile at the zoo together with her former founder male BG134. 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. Although the number of produced chicks has been low, they have contributed as foster pair rearing a huge number of reproduced chicks in different Czech zoos.

Finally, the 4 months old descendant from Tierpark Goldau died just after fledging on the 16th of June. It is the second and consecutive year that it happened by this pair.

STATUS BEARDED VULTURE EEP

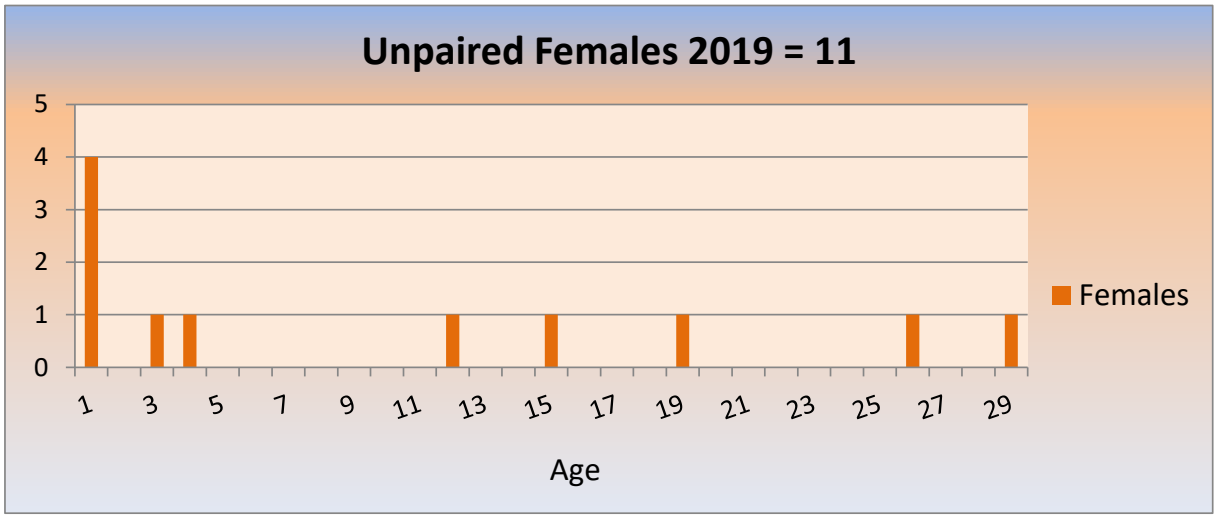
On the 31st of December 2019, there were 178 birds included in the EEP. From them, 83 were males and 94 females and one bird still unknown its sex. The average age between males and females is almost the same (13.4 and 13.9 years old respectively). This shows the existence of a large number of young specimens (≤7 years old), what represents the 30.3% of the total captive population (28 males, 25 females and 1 sex unknown). Further, the distribution of specimens in each age class are between males and females almost the same (see annex table 2) what gives a pyramid shape on age distribution and reflects demographically a very healthy and stable captive population. The actual Bearded Vulture EEP population structure makes possible to guarantee a stable yearly production on chicks covering the EEP needs as well the on-going reintroduction projects.

To maintain this dynamic population, it is necessary to retain regularly a minimum number of produced chicks and this will ensure that every year new couples start to breed, substituting the possible annual leave for old age. This strategy has made possible that during the last years the number of potential pairs which can produce a chick has been stable around 25 pairs (see table on the right). Also, the number of pairs classified into high, medium and low probability to breed with success has remained stable.

Potential breeding pairs		2016	2017	2018	2019
High probability	Number	7	6	8	7
	clutch	6	5	8	7
	hatchling	2	1	4	5
	fledgling	1	0	2	3
Medium probability	Number	13	12	11	10
	clutch	3	2	3	5
	hatchling	1	1	0	0
	fledgling	1	1	0	0
Low probability	Number	5	8	8	8
	clutch	0	2	2	1
	hatchling	0	0	0	0
	fledgling	0	0	0	0
Total potentail pairs		**25**	**26**	**27**	**25**
N. pairs reaching sexual maturity in 1-2 years					10

By including this year 10 juveniles into the EEP we have exceeded the annual minimum of birds that we have to include in the captive network to ensure a stable demographics of the captive population (two more than the number of deaths during the year). This will give us the possibility to be a little more generous with the reintroduction projects in the coming years.

However, with the inclusion of the 11 birds in the EEP (10 juveniles and 1 wild adult) it has not been possible to counteract the sex imbalance in favour to females. This will need to make special attention by including birds in the EEP in the following years, with males having priority over females.



Thanks to the new advisor service that the VCF has offered to the EEP Bearded Vulture Partners, the average age of death at the zoos has increased significantly, being nowadays similar to that of the specialized breeding centres (25.4 years old).

This new service offers all EEP partners the possibility to ask for help and support from the EEP coordinator regarding any question related to keeping and taking care of the Bearded Vultures. Additionally to this, the coordinator is available to visit the Zoo without any extra charge, and work with bird curators on any aspect of Bearded Vulture husbandry. The VCF is only asking for the travel costs to be covered by the hosting zoo.

Since 2012, 19 EEP institutions (17 zoos, one recovery centre and one breeding centre) have already used this new service, and have been visited by the EEP coordinator and received a full report with suggestions about how to adequate existing enclosures to house a pair of Bearded Vulture in the best conditions. In addition, several zoos that already housed a pair of Bearded Vultures in their facilities, have been advised through photos about how to improve their housing conditions. However, this advisor service has been principally requested by new participants. They have been visited from the coordinator before receiving birds. This ensured that their housing conditions are appropriate for housing a young couple of Bearded Vultures. Therefore, the loss of young specimens in these entities –one of the big problems that we had in the past- has been reduced to zero and the average age of death has increased to 25.3 years old: (n= 23 birds; 2012-2019), being the period before (1978-2011) only 15.1 years old (n= 69 birds).

This significant trend has made it possible to increase constantly the number of breeding pairs and initiate new reintroduction projects.

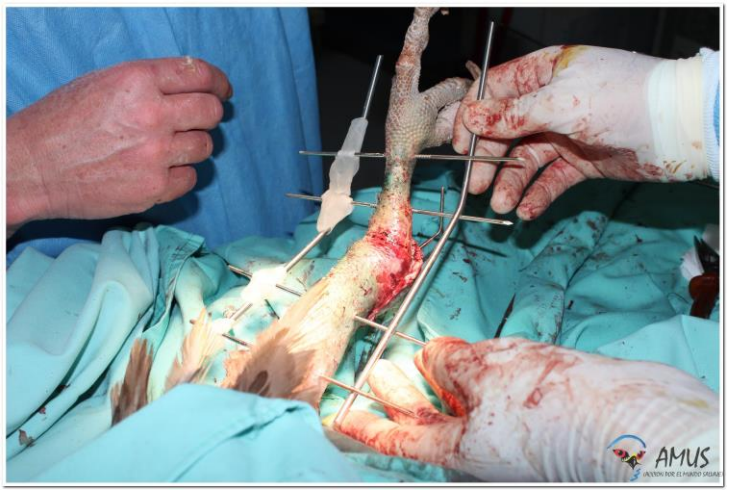
NEW PARTNERS

This year, two new zoos and a recovery centre have expressed their wish to join the Bearded Vulture EEP: Ljubljana Zoo (Slovenia), Halle Zoo (Germany) and Recovery Centre GREFA (Spain). GREFA has already signed the agreement to collaborate with the Bearded Vulture EEP accepting its conditions. Halle zoo has already proposed an aviary and it was accorded that the following year after the breeding season they will be visited by the EEP coordinator and analyse in detail how to re-use one of their aviaries to hold a young pair of Bearded Vulture or to build a new aviary.

Potential aviary for keeping a pair of Bearded Vultures at Halle zoo (Germany).

OUTLOOK / NEWS

First time that an arthrodesis has been done to a Bearded Vulture.



On the 25th of May 2017, a nestling, Flamadel, from the Pyrenees (Aude Department) had to be removed because it was limping on its left leg and transferred to the recovery center from LPO Hérault. After a few days, it was decided to transfer Flamadel to the Catalonia recovery centre Vallcalent -one of the three large specialized Bearded Vulture captive breeding centers included in the EEP-, where in addition a specialized vet on this species is working. X-Ray confirmed that Flamadel, a male, had suffered a fracture distal from the left tibia, between diaphysis and epiphyses, which was fully welded but inclined inwards, being able to use only the healthy leg. In other words, he could only jump on one leg. Several therapies were done without success:

1. A conservative therapy bandaging the leg with a splint trying to relocate it in an anatomical position and to stretch the articulation and
2. A surgery trying to stretch the articulation.

Consequently on the 15th of December 2019, it was decided to do an arthrodesis (fix the articulation). The surgery was done by AMUS recovery center where they have more technical devises. Currently Flamadel is in the process of recovery and hopefully will finally be able to use the leg as a support and thus give it a second chance: to be part of the captive breeding population.

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:

Vulture Conservation Foundation VCF, Wuhrstr. 12, CH-8003 Zürich, Switzerland
Tel: 0041 (0) 44 450 68 06, email: info@4vultures.org, www.4vultures.org
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ANNEX I

Table 1: EEP stock and its distribution as on 31st December 2019

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
1024	982	Aachen zoo	Germany	1	2	{500/513} / {410/290}	F1 / F2/F3	F2	
753	653	Acad. Puy du Fou	France	7	9	{371/103} / {124/041}	F3/F2 / F2/F3	F2	
912	889	Amnéville Zoo	France	4	4	{461/483} / {286/153}	F2/F3 / F3-F4/ F3	F1	
454	502	ASTERS	France	15	14	{108/175} / {179/281}	F2/F3 / F2	F2	
700	622			8	10	{286/153} / {371/103}	F1	F3-F2/F2-F3	
860	627			5	10	{500/513} / {371/103}	F1 / F2/F3	F3-F2/F2-F3	
763	635	Beauval Zoo	France	7	10	{129/481} / {159/270}	F3/F1	F1	
611	634	Beozoo	Serbia	10	10	{199/107} / {034/130}	F1/F2	F1/F2	
298	320	Berlin Zoo	Germany	22	21	{122/118} / {018/272}	F2	F2	
124	329	CC Guadalentín	Spain	30	21	{131/132} / {043/040}	F1	F1	
286	658			30	9	founder / {199/107}	F0	F1/F2	
313	330			21	21	{009/006} / {108/119}	F1/F2	F2-F3/F2	
337	317			21	21	{201/044} / {017/070}	F1/F2	F2	
362	389			20	18	{080/081} / {199/107}	F2	F1/F2	
391	360			18	20	{124/041} / {018/272}	F2	F2	
410	290			17	22	{286/153} / {134/135}	F1	F1	
590	580			11	11	{223/329} / {201/044}	F2/F3	F1/F2	
947	908			3	4	{223/725} / founder	F2/F1	F0	
1006	987			2	2	{681/560} / {500/513}	F1 / F4-F3/F3-F4	F1 / F2/F3	
973	1010			3	2	{GT099/493} / {GT099/493}	?/ F2/F3	?/ F2/F3	Feather problems
1050	911			1	4	founder / {431/436}	F0	F1 / F3/F2	
	976				2	/ {362/389}		F3 / F2/F3	Cataracts
	1045				1	/ founder		F0	
1028				1		{371/103} /	F3-F2/F2-F3		
500	513	CF Torreferrussa	Spain	14	13	founder / {009/006}	F0	F1/F2	
297	115	CF Vallcalent	Spain	22	31	{086/104} / {019/021}	F2	F1	
327	398			21	18	{105/178} / {159/270}	F2/F1	F1	
371	103			19	32	{105/178} / {065/040}	F2/F1	F1/F2	
551	588			12	11	founder / {371/103}	F0	F3-F2/F2-F3	
652	680			11	11	founder / founder	F0	F0	
972				3		founder /	F0		
368				20		{159/270} /	F1		Handraised
1051				17?		founder /	F0		
340	338	Chomutov Zoo	Czech Rep.	21	21	{018/272} / {134/135}	F2	F1	
846	859	Córdoba Zoo	Spain	5	5	{722/723} / {018/336}	F2	F2 / F2/F3	
826	828	FPWC - CWR	Armenia	20?	25?	founder / founder	F0	F0	
978				2		{826/828}	F1		sex unknown
672	576	Frankfurt Zoo	Germany	9	11	{337/317} / {108/175}	F2/F3 / F3	F2/F3 / F2	

Bearded Vulture EEP: results for 2019

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
788	281	Helsinky Zoo	Finland	6	23	{297/115} / {131/132}	F3/F2	F1	
804	801	Alp. Innsbruck	Austria	6	6	{340/338} / {371/103}	F3/F2	F3-F2/F2-F3	
847	829	La Garenne Zoo	Zwitzerland	5	5	{313/330} / {108/175}	F2/F3 / F3-F4/F3	F2/F3 / F2	
180	274	Liberec Zoo	Czech Rep.	35	34	{161/162} / founder	F1	F0	
654	656			9	9	{108/175} / {180/274}	F2/F3 / F2	F2/F1	
662	668	MónNatura	Spain	9	9	{371/103} / {172/290}	F3/F2 / F2/F3	F2/F3 / F2	
748	832	Moscow Zoo	Rusia	7	5	{108/175} / {180/274}	F2/F3 / F2	F2/F1	
	480	Nikolaev Zoo	Ucraina		19	/ founder		F0	
	726				12	/ founder		F0	
744	657	Novosibirsk Zoo	Rusia	24	9	founder / {223/329}	F0	F2/F3	
1008	1009			21	20	founder / founder	F0	F0	
18	336	Nuremberg Zoo	Germany	41	21	{019/021} / {201/044}	1	F1/F2	
993	896	Oasi Sant' Alessio	Italy	2	4	{199/107} / {399/278}	F1/F2	F2 / F2/F3	
325	322	Ostrava Zoo	Czech Rep.	21	21	{017/070} / {152/153}	F2	F1	
207	233			26	25	{017/070} / {122/118}	F2	F2	
850	747	P. Animalier Pyrénées	France	5	7	{223/725} / {286/153}	F2/F1	F1	
894	598	Parc des Oiseaux	France	4	11	{286/153} / {145/276}	F1	F2 / F2/F3	
664	659	Parc Pairi Daiza	Belgium	9	9	{391/360 / {017/070	F3	F2	
451	469	Parco Nat. Viva	Italy	15	15	{108/175} / {018/272}	F2/F3 / F2	F2	
914	903	Plock Zoo	Poland	4	4	{461/483} / {174/118}	F2/F3 / F3/F4 / F3	F2	
328	561	Posen Zoo	Poland	21	12	{080/081} / {313/330}	F1	F2/F3 / F3-F4/F3	
511	519	Prague Zoo	Czech Rep.	13	13	{002/003} / {105/178}	F1	F2/F1	
	142				29	/ {009/041}		F1/F2	
234	397	Priv. Montowl	Italy	25	18	{086/104} / {201/044}	F2	F1/F2	
830	620			5	10	{034/130} / {172/290}	F1/F2	F2/F3 / F2	
591	636	Priv. B. Sloman	England	11	11	{080/081} / {722/723}	F1	F2	
461	483	RC Green Balkans	Bulgaria	15	14	{199/107} / {108/175}	F1/F2	F2/F3 / F2	
1035	956			1	3	{654/656} / {174/118}	F3/F4 / F3 / F3/F2	F2	
1034	999			1	2	{399/278} / {340/338}	F2 / F2/F3	F3/F2	
17	70	Richard Faust Center	Austria	41	36	{019/021} / {022/023}	F1	F1	
594	6			11	42	{172/290} / {019/020}		F1	
108	175			31	28	{065/040} / {152/153}	F1/F2	F1	
199	107			34	32	founder / {150/151}	F0	F1	
399	278			18	23	{159/270} / {065/074}	F1	F1/F2	
468	381			15	19	{223/132} / {159/270}	F2/F1	F1	
87	547			34	12	{014/010} / {105/178}	F1	F2/F1	
681	560			12	12	founder / {371/103}	F0	F3-F2/F2-F3	
844	673			5	9	{337/317} / {313/330}	F2/F3 / F3	F2/F3 / F3-F4/F3	

Vulture Conservation Foundation VCF, Wuhrstr. 12, CH-8003 Zürich, Switzerland
Tel: 0041 (0) 44 450 68 06, email: info@4vultures.org, www.4vultures.org
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Bearded Vulture EEP: results for 2019

N. ♂	N. ♀	LOCATION	COUNTRY	Age ♂	Age ♀	PARENTAGE {m/f} / {m/f}	GENERATION ♂	GENERATION ♀	REMARKS
857	835	Richard Faust Center	Austria	5	5	{468/453} / {399/278}	F3/F2 / F2	F2 / F2/F3	
212	40			26	40	{152/153} / {034/035}	F1	F1	
80	518			35	13	{019/021} / {087/054}	F1	F1	
	352				20	/ {086/104}		F1	
	453				15	/ {286/153}		F1	
	600				11	/ {159/270}		F1	
	619				10	/ {297/115}		F3/F2	
	892				4	/ {223/725}		F2/F1	
	969				3	/ {145/276}		F2 / F2/F3	
	398				18	/ {159/270}		F1	
1011				5		{203/298} /	F2		Handraised
1039				1		{681/560} /	F1 / F4-F3/F3-F4		
1044				1		{431/436} /	F1 / F3/F2		
1048				1		{431/436} /	F1 / F3/F2		
977	1007	Riga Zoo	Letonia	2	2	{297/115} / {108/175}	F3/F2	F2/F3 / F2	
201	44	Schönbrunn Zoo	Austria	32	40	founder / {002/003}	F0	F1	
431	436	Tallinn Zoo	Estonia	20	16	founder / {180/274}	F0	F2/F1	
294	292	Tier. Friedrichsfelde	Germany	22	22	{017070} / {199/107}	F1	F1/F2	
437	503			16	14	{180/274} / {294/292}	F2/F1	F3 / F2/F3	
174	118	Tier.Goldau	Zwitzerland	28	31	{134/135} / {154/155}	F1	F1	
60	91			37	34	{034/035} / {005/006}	F1	F2	
145	276			29	23	{131/132} / {199/107}	F1	F1/F2	
	209	Walsrode	Germany		26	/ {150/151}		F1	
789	456	ZooBotanico Jerez Zoo	Spain	6	15	{180/274} / {286/153}	F2/F1	F1	

Table 2: Age distribution of bearded vultures within the EEP as on 31st December 2019

MALE										FEMALE			
						42	6						
					17	18	41						
							40	44	40				
							39						
							38						
					60	199*	37						
							36	70					
					80	180	35						
						87	34	274*	91				
							33						
						201*	32	107	103				
						108	31	118	115				
					124	286*	30						
						145	29	142					
						174	28	175					
							27						
					207	212	26	209					
						234	25	828*	233				
						744*	24						
							23	281	278	276			
				294	297	298	22	292	290				
313	325	327	328	337	340	1008*	21	338	336	330	329	322	320	317
			362	368	431*	826*	20	1009*	360	352			
						371	19	480*	381				
					391	399	18	398	397	389			
					410	1051*	17						
						437	16	436					
			451	454	461	468	15	456	453	469			
						500*	14	503	502	483			
						511	13	519	518	513			
					551*	681*	12	726*	561	560	547		
			590	591	594	652*	11	680*	636	600	598	588	580	576
						611	10	635	634	627	622	620	619	
			654	662	664	672	9	673	668	659	658	657	656	653
						700	8						
				748	753	763	7	747					
				788	789	804	6	801					
830	844	846	847	850	857	860	1011	5	859	835	832	829		
					894	912	914	4	911	908*	903	896	892	889
					947	972*	973	3	969	956				
978					977	993	1006	2	1010	1007	999	987	982	976
		1024	1034	1035	1039	1050*	1	1048	1045*	1044	1028	1020		

minimum age
sex unknown
* founder

Table 3: Breeding pairs and their results in 2019

COUNTRY	PAIR	LAY DATE	HATCH DATE
ARMENIA			
Yerevan zoo	BG 828 x BG 826	1st: ?09th Dec 2nd: ?13th Dec	27th Jan (died 28th Jan) 28th Feb (died 29th Jan)
AUSTRIA			
Alpenzoo Innsbruck	BG 804240338 x BG 801371103	1st: 10th Marc	Broken/Infertile
Tiergarten Schönbrunn	BG 201 x BG 044002003	1st: 12th Jan	Infertile/Aborted
Richard Faust Zentrum	BG 108065040 x BG 175152153	1st: 17th Dec 2nd: 24th Dec	08th Feb 14th Feb
	BG 017019021 x BG 070022023	1st: 31st Dec	24th Feb
	BG 199 x BG 107150151	1st: 11th Jan 2nd: 20th Feb	Broken 11th Jan 14th Mar
	BG 087014010 x BG 006019020	1st: 13th Jan	Broken (end January)
	BG 399159270 x BG 278065074	1st: 09th Jan	03rd Mar
	BG 681 x BG 560371103	1st: 08th Jan 2nd: ?13th Jan	Aborted (end incubation) 09th Mar
	BG 212152153 x BG 040034035	1st: 19th Feb	Infertile
BULGARIA			
Rescue Center Green Balkans	BG 461199107 x BG 483108175	1st: 03rd Jan	25nd Feb
ESTONIA			
Tallinn Zoo	BG 431 x BG 436180274	1st: 23rd Jan 2nd: 30th Jan	16th Mar 26th Mar
FRANCE			
Beauval Zoo	BG 763129482 x 635159270	1st: ?28th Jan	Infertile
Asters Breeding centre	BG 454 x BG 502	1st: 6th Jan	Infertile
FINLAND			
Helsinki Zoo	BG 788297115 x BG 281131132	1st: 27th-29th Jan	Infertile
GERMANY			
Tierpark Friedrichsfelde Berlin	BG 294017070 x BG 292199107	1st: 15th Jan	Aborted (end incubation)
	BG 437180274 x BG 503294292	1st: 26th Jan 2nd: 31st Jan	Broken 25th Mar
Berlin Zoo	BG 298122118 x BG 320018272	1st: 25th Jan	Infertile/Broken (16th Mar)

Nuremberg Zoo	BG 018019021 x BG 336201044	1st: 17th Jan	13th Mar
ITALY			
Center Monticello (M. Albertini)	BG 234086104 x BG 397201044	1st: 17th Jan	Aborted
Parco Natura Viva	BG 451108175 x BG 469018272	1st: 02nd Feb	27th Mar
SERBIA			
Belgrade Zoo	BG 611199197 x BG 634034130	1st: ?24th Jan	23rd Mar (died 26th Mar)
		2nd: ?30Th Jan	Broken/Infertile 26th Mar
SPAIN			
Centro de Cría Guadalentín	BG 313009006 x BG 330108119	1st: 29th Dec	20th Feb
		2nd: 05th Jan	27th Feb
	BG 391124041 x BG 360018272	1st: 30th Dec	22nd Feb
		2nd: 05th Jan	Infertile
	BG 337201044 x BG 317017070	1st: 15th Jan	09th Mar
		2nd: 21st Jan	Aborted
	BG 362080081 x BG 389199107	1st: 22nd Dec	16th Feb
		2nd: 29th Dec	Infertile
	BG 410286153 x BG 290134135	1st: 02nd Jan	Aborted (middle incubation)
		2nd: 08th Jan	Aborted (end incubation)
		3rd: 16th Jan	Aborted (end incubation)
	BG 124131132 x BG329043040	1st: 07th Dec	29th Jan
		2nd: 14th Dec	04th Feb
Centre de Fauna Vallcalent	BG 371105178 x BG 103065040	1st: 01st Jan	21st Feb
		2nd: 08th Jan	01st Mar
		3rd: 28th Jan	Infertile
		4th: 06th Feb	Aborted (end incubation)
	BG 327105178 x BG 381159270	1st: 07th Jan	Infertile
		2nd: 13th Jan	Infertile
	BG 297086104 x BG 115019021	1st: 17th Dec	08th Feb
		2nd: 19th Dec	Infertile
		3rd: 12th Jan	07th Mar
Centre de Fauna Torreferrussa	BG 500 x BG 513009006	1st: 22nd Dec	Infertile
		2nd: 28th Dec	18th Feb
		3rd: 31st Jan	Infertile
SWITZERLAND			
Breeding Centre Goldau/Rigi	BG 174134135 x 118154155	1st: 22nd Dec	12th Feb (died by fledging)
	BG 060034035 x BG 091005006	1st: 26th Dec	18th Feb

	BG 145131132 x BG 276199107	1st: 14th Jan 2nd: 20th Jan	08th Mar (died 5 days old) Aborted
La Garenne	BG 212152153 x BG 130150151	-	Female died 12th Jan
TS-REPUBLIC			
Liberec Zoo	BG 180161162 x BG 274	1st: 14th Dec 2nd: 21st-22nd Dec	Aborted (died during hatching) 12th Feb
	BG 654108175 x BG 656180274	1st: 10th Jan	04th Mar
Chomutov Zoo	BG 340018272 x BG 338134135	1st: 12th Jan	07th Mar
Ostrava Zoo	BG 207017070 x BG 233122118	1st: 22nd Dec 2nd: 31st Dec	13th Feb (died 1 day old) 21st Feb
	BG 325017070 x BG 322152153	-	Broken 23rd Jan
Prague Zoo	BG 134 x BG 142009041 BG 511108175 x BG 519105178	1st: 19th Jan 1st: 24th Jan	Male died 23rd dec Infertile
RUSSIA			
Novosibirsk Zoo	BG 1008 x BG 1009	1st: ?20th Feb	Infertile

Table 4. Destination Offspring in 2019

STUDBOOK	PARENTAGE	SEX	BREEDING	DESTINATION
BG 1012 1)	BG 826 x BG 828		FPWC	DIED
BG 1013 2)	BG 826 x BG 828		FPWC	DIED
BG 1014	BG 124 x BG 329	m	CC Guadalentín	RELEASE (Lozère, Grands Causses, FRANCE)
BG 1015	BG 124 x BG 329	f	CC Guadalentín	RELEASE (Lozère, Grands Causses, FRANCE)
BG 1016 3)	BG 180 x BG 274		Liberec zoo	DIED
BG 1017	BG 297 x BG 115	f	CF Vallcalent	RELEASE (Lozère, Grands Causses, FRANCE)
BG 1018	BG 108 x BG 175	f	Richard-Faust-Zentrum	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1019 4)	BG 174 x BG 118		Tierpark Goldau	DIED
BG 1020	BG 180 x BG 274	f	Liberec zoo	**BREEDING** (Richard-Faust-Zentrum)
BG 1021 5)	BG 207 x BG 233		Ostrava zoo	DIED
BG 1022	BG 108 x BG 175	m	Richard-Faust-Zentrum	RELEASE (Vercors, FRANCE)
BG 1023	BG 362 x BG 389	f	CC Guadalentín	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1024	BG 500 x BG 513	m	Torreferrussa	**BREEDING** (Aachener Tierpark Euregiozoo)
BG 1025	BG 060 x BG 091	f	Tierpark Goldau	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1026	BG 313 x BG 330	m	CC Guadalentín	RELEASE (Vercors, FRANCE)
BG 1027	BG 207 x BG 233	f	Ostrava zoo	RELEASE (Léoux Valley, Baronnies, FRANCE)
BG 1028	BG 371 x BG 103	f	CF Vallcalent	RELEASE (P.N. Castril, Andalusia, SPAIN)
BG 1029	BG 391 x BG 360	f	CC Guadalentín	RELEASE (P.N. Castril, Andalusia, SPAIN)
BG 1030	BG 017 x BG 070	m	Richard-Faust-Zentrum	RELEASE (Lozère, Grands Causses, FRANCE)
BG 1031	BG 461 x BG 483	f	Green Balkans	RELEASE (Léoux Valley, Baronnies, FRANCE)
BG 1032	BG 313 x BG 330	m	CC Guadalentín	RELEASE (Lozère, Grands Causses, FRANCE)
BG 1033	BG 371 x BG 103	m	CF Vallcalent	RELEASE (P.N. Tinença, Valencia, SPAIN)
BG 1034	BG 399 x BG 278	m	Richard-Faust-Zentrum	**BREEDING** (Green Balkans)
BG 1035	BG 654 x BG 656	m	Liberec zoo	**BREEDING** (Green Balkans)
BG 1036	BG 297 x BG 115	f	CF Vallcalent	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1037	BG 340 x BG 338	f	Chomutov zoo	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1038 6)	BG 145 x BG 276		Tierpark Goldau	DIED
BG 1039	BG 681 x BG 560	m	Richard-Faust-Zentrum	**BREEDING** (Richard-Faust-Zentrum)
BG 1040	BG 337 x BG 317	f	CC Guadalentín	RELEASE (P.N. Tinença, Valencia, SPAIN)
BG 1041	BG 018 x BG 336	f	Nuremberg zoo	RELEASE (Niolo Valley, Corsica, FRANCE)
BG 1042	BG 199 x BG 107	m	Richard-Faust-Zentrum	RELEASE (Niolo Valley, Corsica, FRANCE)
BG 1044	BG 431 x BG 436	f	Tallinn zoo	**BREEDING** (Richard-Faust-Zentrum)
BG 1045	Bonifatu pair	f	Wild Corsica	**BREEDING** (CC Guadalentín)
BG 1046 7)	BG 611 x BG 634		Belgrade zoo	DIED
BG 1047	BG 437 x BG 503	m	Tierpark Friedrichsfelde	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1048	BG 431 x BG 436	f	Tallinn zoo	**BREEDING** (Richard-Faust-Zentrum)
BG 1049	451x469	m	Parco Natura Viva	RELEASE (Guadalentín, Andalusia, SPAIN)
BG 1050	Bonifatu pair	m	Wild Corsica	**BREEDING** (CC Guadalentín)

1) died throw out of the nest by the male in the morning the day after hatching.
2) died 15 hours after assisting hatch. Too weak.
3) died during hatching. Was too big being not able to rotate the head.
4) died by colliding with the cage frame by fledging.
5) died with an age from 1 day. Assisted hatch because of hatching problems. Yolk sack was not 100% absorbed.
6) died with an age from 5 days. An adult took the chick to the edge of the nest and died because of cooling.
7) died during adoption with an age from 3 days: Female reacted aggressive and injured deadly.