

Individual identification of free-living bearded vultures (*Gypaetus barbatus*) based on feather samples collected in 2007

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Material and Methods

Feather samples

In 2007, 69 feather samples were collected in the field and sent to ecogenics. All but two old feathers collected in the nest Zebbru were subject to DNA extraction using the protocol described in Gautschi et al. (2003). To test for successful DNA extraction, the samples were used in a P2/P3 sexing PCR (Griffiths et al. 1996). The PCR products were digested with the restriction enzyme *HaeIII* and the sex of the sample was determined by agarose gel electrophoresis as described in Griffiths et al. (1996).

Of the 52 samples that produced a product in this first sexing PCR, 38 were further analysed with 14 microsatellite DNA markers (Gautschi et al. 2000).

No genetic fingerprint could be obtained from down feathers collected on 31.9.2007 at the foot of the nest in Pesey-Nancroix and on 22.9.2007 on a chamois carcass in Val Champagne Samedan (Table 1). The probably are not of bearded vulture origin.

Genotyping (= generating a genetic fingerprint)

Because of low DNA quantity and quality resulting from extractions of moulted feather samples, each sample was genotyped 3 to 9 (i.e. multiple tube approach). That way the two most frequent genotyping errors (i.e. false alleles, and allelic-drop out (Taberlet et al. 1999) can be minimised.

Computer simulations

Paternity simulations were performed using the computer program CERVUS 2.0 (Marshall et al. 1998) as described in the final report 2003.

Results

Individual genotypes found in the database

Sixteen of the 18 genotypes detected in the feather samples could be found in the database.

Feathers from birds released since 1996

One feather of **BG348 (Sereno)** was found on 24.5.2007 below the nest site of Saint Paul sur Ubaye. (Table 1).

Of **BG359 (Pablo)** a total of three feathers were collected in Dérborance, one feather on 23.6.2007 and two on 17.8.2007 at the eyrie.

Also at the eyrie of Dérborance one feather of **BG299 (Gildo)** and two of **BG304 (Aisone)** were found on 17.8.2007.

In the Val Sinestra one feather of **BG393 (Stift)** was collected below the sleeping place on 31.8.2007.

Three feathers of **BG395 (Martell)** were found below the eyrie of the Val Tantermozza on 9.10.2007.

In the Val Chamuera, two feathers from **BG364 (Louis)** were collected below the eyrie "Melna" on 16.10.2007.

Feathers from birds released before 1996

Several genotypes could not be directly matched to an individual studbook number. However, they have been identified in feather samples from previous years.

In Aravis, Passage du Saix a feather of **GT028**, a male offspring of the Bargy pair, was found on 1.9.2007.

One feather of **GT008**, also a male offspring of the Bargy pair (and likely **Phénix**), was collected at the foot of the nest in Peisey-Nancroix on 31.9.2007.

Three feathers of a male offspring of the pair Zebru (GT001/BG264), **GT026**, were collected below the eyrie of the Val Tantermozza on 9.10.2007.

In Serraglio, two feathers of **GT023**, a male offspring of the Livigno pair, were collected on 15.8.2007.

In the Val Chamuera below the eyrie "Melna" two feathers of the female **GT004** were collected on 16.10.2007. **GT004** is an offspring of the Bormio pair that existed after 2000 but before 2002 (i.e. GT002/ GT003).

Below the eyrie of Braulio, two feather of **GT003**, a female offspring of the breeding pair BG017/BG070 were found on 26.7.2007.

On 31.10.2007 two feathers of **GT006** an other female offspring of the breeding pair BG017/BG070, were collected below the active nest of Livigno.

Three feathers of **GT001**, a female that was first breeding in Bormio and then changed breeding place and partner, were found below the active nest of Zebru on 16.10.2007.

At the same place and date 3 feathers of **GT029**, an offspring of GT001 and GT002 (the first pair of Bormio) were collected.

Individual genotypes not found in the database

GT031 is a female offspring of the Livigno pair (GT005/GT006). A single feather was found below the sleeping place in the Val Sinestra on 31.8.2007.

On 12.8.2007 a feather of **GT032**, a female offspring of the pair Val d'Isère (GT010/GT009) was collected in the Val Savarenche in Aosta.

Summaries

Tables 4 and 5 present summaries of the identification of birds hatched in the wild and the composition of breeding pairs.

References

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- Marshall TC, Slate J, Kruuk L and Pemberton JM. 1998. Statistical confidence for likelihood-based paternity inferences in natural populations. *Molecular Ecology*, 7, pp. 639-655.
- Taberlet P, Waits LP, Luikart G. 1999. Noninvasive genetic sampling: look before you leap. *Trends in Ecology and Evolution*, 14, pp 323-327.

Table 1. Feather samples received and analysed in 2007. Listed are the sampling areas and locations, the date of sampling, the person in charge, the sample name given in the laboratory, the sex, the ID of related individuals (P =most likely parents and R = related birds, but not necessarily the parents), and individual ID (BG= studbook number, GT = genotype number). Samples revealing the same genotype are given the same genotype identity.

Sampling area	Sampling location	Date of sampling	Collector	Sample Name	Sex	Related Individuals	Individual ID
France							
Saint Paul sur Ubaye	Below nest site	24.5.2007	Francois Breton	PAUL1	M	BG011/BG054 ^P	BG348, Sereno
	Below nest site	24.5.2007	Francois Breton	PAUL2	-	-	-
Aravis	HS 10 AR 3 Passage du Saix	1.9.2007	Etienne Marlé	Ara01	M	GT007/GT016 ^P	GT028
Peisey-Nancroix	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan06	M	GT007/GT016 ^P	GT008
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan07	(M)	No results	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan08	F	No results	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan09	-	-	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan10	-	-	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan11	-	-	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan12	-	-	-
	Foot of the nest	31.9.2007	Sandrine Berthillot	Nan13	-	-	-
Switzerland							
Dérborance	?	23.6.2007	Serge Denis	Deb04	M	BG134/BG135 ^P	BG359, Pablo
	eyrie	17.8.2007	Raphael Arlettaz	Deb05	M	BG134/BG135 ^P	BG359, Pablo
	eyrie	17.8.2007	Raphael Arlettaz	Deb06	F	BG034/BG130 ^P	BG299, Gildo
	eyrie	17.8.2007	Raphael Arlettaz	Deb07	M	BG152/BG153 ^P	BG304, Aisone
	eyrie	17.8.2007	Raphael Arlettaz	Deb08	M	BG134/BG135 ^P	BG359, Pablo
	eyrie	17.8.2007	Raphael Arlettaz	Deb09	(M)	BG152/BG153 ^P	BG304, Aisone
Val Sinestra	Below sleeping place	31.8.2007	David Jenny	Sin31	F	BG083/BG104 ^P	BG393, Stiff
	Below sleeping place	31.8.2007	David Jenny	Sin32	F	GT005/ GT006 ^P	GT031
	Below sleeping place	31.8.2007	David Jenny	Sin33	(M)	Not analyzed	-
	Below sleeping place	31.8.2007	David Jenny	Sin34	-	-	-
	Below sleeping place	31.8.2007	David Jenny	Sin35	F	Not analyzed	-
	Below sleeping place	31.8.2007	David Jenny	Sin36	F	Not analyzed	-
	Below sleeping place	31.8.2007	David Jenny	Sin37	F	Not analyzed	-
Val Tantermozza	Below eyrie	9.10.2007	David Jenny	TAN03	F	BG122/BG118 ^P	BG395, Martell
	Below eyrie	9.10.2007	David Jenny	TAN04	-	-	-
	Below eyrie	9.10.2007	David Jenny	TAN05	F	BG122/BG118 ^P	BG395, Martell
	Below eyrie	9.10.2007	David Jenny	TAN06	F	BG122/BG118 ^P	BG395, Martell
	Below eyrie	9.10.2007	David Jenny	TAN07	-	-	-
	Below eyrie	9.10.2007	David Jenny	TAN08	M	GT001/BG264 ^P	GT026
	Below eyrie	9.10.2007	David Jenny	TAN09	(F)	Not analyzed	-
	Below eyrie	9.10.2007	David Jenny	TAN10	(M)	GT001/BG264 ^P	GT026
	Below eyrie	9.10.2007	David Jenny	TAN11	(M)	GT001/BG264 ^P	GT026
Serraglio	Below eyrie	15.8.2007	David Jenny	SER06	M	GT005/GT006 ^P	GT023
	Below eyrie	15.8.2007	David Jenny	SER07	(M)	GT005/GT006 ^P	GT023
Val Champagna Samedan	On chamois carcass	22.9.2007	JA Thomas Wehrli	SAM01	-	-	-
	On chamois carcass	22.9.2007	JA Thomas Wehrli	SAM02	M	No bearded vulture	-
	On chamois carcass	22.9.2007	JA Thomas Wehrli	SAM03	(M)	No bearded vulture	-
	On chamois carcass	22.9.2007	JA Thomas Wehrli	SAM04	-	-	-
	On chamois carcass	22.9.2007	JA Thomas Wehrli	SAM05	-	-	-
Val Chamuera/Val Malat	Below eyrie Melna	16.10.2007	David Jenny	CHA01	M	BG019/BG021 ^P	BG364, Louis
	Below eyrie Melna	16.10.2007	David Jenny	CHA02	M	BG019/BG021 ^P	BG364, Louis
	Below eyrie Melna	16.10.2007	David Jenny	CHA03	F	GT002/GT003 ^P	GT004
	Below eyrie Melna	16.10.2007	David Jenny	CHA04	F	GT002/GT003 ^P	GT004
Italy							
Aosta Braulio	Val Savarenche	12.8.2007	Martino Nicollino	SAV01	F	GT010/GT009 ^P	GT032
	Below eyrie	26.7.2007	David Jenny	BO35	F	BG017/BG070 ^P	GT003
	Below eyrie	26.7.2007	David Jenny	BO36	F	BG017/BG070 ^P	GT003
	Below eyrie	26.7.2007	David Jenny	BO37	F	Not analyzed	-
	Below eyrie	26.7.2007	David Jenny	BO38	-	-	-
	Below eyrie	26.7.2007	David Jenny	BO39	F	Not analyzed	-
Livigno	Below active nest	31.10.2007	Enrico Bassi	LIV17	-	-	-
	Below active nest	31.10.2007	Enrico Bassi	LIV18	F	BG017/BG070 ^P	GT006
	Below active nest	31.10.2007	Enrico Bassi	LIV19	F	BG017/BG070 ^P	GT006
	Below active nest	31.10.2007	Enrico Bassi	LIV20	F	Not analyzed	-
	Below active nest	31.10.2007	Enrico Bassi	LIV21	F	Not analyzed	-
	Below active nest	31.10.2007	Enrico Bassi	LIV22	F	Not analyzed	-

Table 1. Continued

Sampling area	Sampling location	Date of sampling	Collector	Sample Name	Sex	Related Individuals	Individual ID
Zebbru	Below active nest	16.10.2007	Enrico Bassi	ZEB44	F	BG034, BG054 ^R	GT001
	Below active nest	16.10.2007	Enrico Bassi	ZEB45	M	GT001/GT002 ^P	GT029
	Below active nest	16.10.2007	Enrico Bassi	ZEB46	M	GT001/GT002 ^P	GT029
	Below active nest	16.10.2007	Enrico Bassi	ZEB47	M	GT001/GT002 ^P	GT029
	Below active nest	16.10.2007	Enrico Bassi	ZEB48	-	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB49	F	BG034, BG054 ^R	GT001
	Below active nest	16.10.2007	Enrico Bassi	ZEB50	F	BG034, BG054 ^R	GT001
	Below active nest	16.10.2007	Enrico Bassi	ZEB51	M	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB52	-	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB53	M	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB54	-	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB55	F	Not analyzed	-
	Below active nest	16.10.2007	Enrico Bassi	ZEB56	F	Not analyzed	-

Table 2. Overview of all bearded vulture genotypes sampled from 1998 till 2007. Each genotype was given an individual identification number. Listed are, the laboratory identities of the samples that could be assigned to the genotype, the sampling date, location and area and the number of samples analysed. For each genotype the studbook numbers of the closest relatives are given (P= parents, R=relatives, not necessarily the parents).

Genotype	Relatedness	Sex	Laboratory ID	Sampling date	Sampling location	Sampling area	No of samples
GT001	BG034, BG054 ^R	F	F13.8.3, Bo1, Bo2	13.08.1998	Nest	Bormio	3
			Zeb4, Zeb6	07.08.2002	Below Nest	Zebbru	2
			Zeb25, 26, 27, 29	17.06.2003	Eyrie	Zebbru	7
			Zeb7, 9, 12	07.08.2003	Nest	Zebbru	3
			Zeb35, 36	28.09.2004	Nest	Zebbru	2
			Zeb44, Zeb49, Zeb50	16.10.2007	Below active nest	Zebbru	3
GT002	BG107/BG151 ^R	M	Bo6, Bo7	13.08.1998	Nest Bormio	Bormio	2
			Bo18	03.05.1999	Sleeping Place	Bormio	1
			Bo12	06.08.2001	Sleeping Place	Bormio	1
			Sin26, Sin 28	13.10.2004	Sleeping Place	Sinestra	2
GT003	BG017/BG070 ^P	F	Bo10, Bo11	06.08.2001	Sleeping Place	Bormio	2
			Bo13	28.08.2001	Nest Bormio	Bormio	1
			Bo15, Bo16	06.08.2002	Nest Site	Bormio	2
			Bo28, Bo30, Bo32	12.10.2005	Sleeping Place	Bormio	3
GT004	GT002/GT003 ^P	F	BO35, BO36	26.7.2007	Below eyrie	Bormio	2
			Bo24	13.08.2000	Below Nest site	Bormio	1
GT005	BG051/BG049 ^P	M	CHA03, CHA04	16.10.2007	Below eyrie Melna	Val Chamuera	2
			Liv1-Liv5	01.05.1999	Nest	Livigno	5
GT006	BG017/BG070 ^P	F	Liv16	2006	Trepalle/Eira's Pass	Livigno	1
			Punt Ota	25.01.1998	Punt Ota	-	1
			Liv9	05.08.2002	Nest Livigno	Livigno	1
GT007	BG034/BG035	F	Liv11	05.08.2003	Horst	Livigno	1
			LIV18, LIV19	31.10.2007	Below active nest	Livigno	2
			Bargy	April 2000	-	Bargy	1
GT008	GT007/GT016 ^P	M	Bag5-Bag7	22.04.2003	Nest	Bargy	3
			Bag1, Bag2	03.07.2001	Colouring zone	Bargy	2
GT009	BG009/BG041 ^P	M	Nan 1	No date	Peisey-Nancroix	Vanoise NP	1
			Nan 05	30.9.2006	Rocher de Sétives	Peisey-Nancroix	1
			Nan06	31.9.2007	Foot of the nest	Peisey-Nancroix	1
			Val1	27.06.2001	-	Val d'Isère	1
GT010	BG19/BG021 ^P	F	Val8	No date	-	Val d'Isère	1
			Val11	2005	Below nest site	Val d'Isère	1
			Val2	27.06.2001	-	Val d'Isère	1
GT011	BG011/BG054 ^P	F	Val6	No date	-	Val d'Isère	1
			Val8.1	2005	Below nest site	Val d'Isère	1
GT012	BG019/BG021 ^P	F	Val3	27.06.2001	-	Val d'Isère	1
			HB1 (HB8)	-	-	Heiligenblut	1-2
GT013	BG034/BG065 ^R	F	HB2	2001	Horst	Heiligenblut	1
			HB3, 4, 7, 9	Aug. 2002	-	Heiligenblut	4
			Gro01	July 2005	Near releasing site	Grossglockner	1
			Fus03	28.7.2005	-	Fuscherlacke	1
			Glo07	9.8.2006	Hochtor/ Glocknerstrasse	Hohe Tauern	1
			Lechtal	Wi 98/99	-	Lechtal	1
GT014	BG009/BG041 ^P	M	Gast1-Gast5	2003	Nest	Gastein	5
			Köt1, Köt2	?	Sleeping place	Kötschachtal	2

Table 2. Continued

GT016	BG070/BG022 ^R	?	Bag8	27.09.2004	Near nest site	Bargy	1
GT017	BG131/BG132 ^P	F	Pont1	Aug. 2003	Nest	Ponte Bernardo	1
			Pont8	Aug. 2004	Nest	Ponte Bernardo	1
GT018	GT001/GT002 ^P	M	Van2, 4, 8	No date	-	Termignon	3
GT019 †	GT005/GT006 ^P	F	Embryo free	01.05.1999	Nest Livigno	Livigno	1
GT020 †	Köt1	M	Köt3	?	Nest	Kötschachtal	Egg skin
GT021	GT007/GT016	M	Pasc07	07.07.2004	Known colouring zone	Passy	1
			Pasn01,Pasn08	07.07.2004	New colouring zone	Passy	2
GT022	GT005/GT006	F	SNP01, SNP05, SNP06	20.06.2005	Val Stabelchod	CH	3
						Nationalpark	
GT023	GT005/GT006	M	For01, For03	12.10.2005	Sleeping place	Foraz	2
			Ser01, Ser02	20.7.2006	Under sleeping place	Serraglio	2
			SER06, SER07	15.8.2007	Below eyrie	Serraglio	2
GT024	GT005/GT006	F	For02	12.10.2005	Sleeping place	Foraz	1
GT025	BG019/BG021 ^P	M	Gast19, Gast20	2.8.2006	Nest	Heitzing	2
GT026	GT001/BG264 ^P	M	Sch01	28.5.2006	Murtiröt	S-chanf	1
			Cim01	17.7.2006	Cima dei Buoi	CH Nationpark	1
			Tan01, Tan02	29.10.2006	Below eyrie	Val Tantermozza	2
			TAN08, TAN10, TAN11	9.10.2007	Below eyrie	Val Tantermozza	3
GT027	BG019/BG021 ^P	F	Nan02	19.9.2004	Under unoccupied nest	Mont Blanc de Peisey	1
			Nan03, Nan04	28.4.2006	Rocher de Séteives	Peisey-Nancroix	2
GT028	GT007/GT016 ^P	M	Lan01		Lancheron à Mayères	Aravis Nord 74	1
			Ara01	1.9.2007	Passage du Saix	Aravis	1
GT029	GT001/GT002 ^P	M	Zeb43	July 2006	Zebbru Valley	Zebbru	1
			Zeb45, Zeb46, Zeb47	16.10.2007	Below active nest	Zebbru	3
GT030	BG051/BG049 ^P	M	Maira03	12.9.2006	Maira Valley	Alpi-Marittime	1
GT031	GT005/GT006 ^P	F	Sin32	31.8.2007	Below sleeping place	Val Sinestra	1
GT032	GT010/GT009 ^P	F	SAV01	12.8.2007	Val Savarenche	Aosta	1

Table 3. Overview of bearded vulture individuals identified through the analysis of feather samples collected from 1998 till 2007. For each individual the studbook number, the name, the laboratory identities, the sampling date, location and area and the number of samples analysed are given.

Studbook No.	Name	Sex	Laboratory ID	Sampling date	Sampling location	Sampling area	No of samples
BG264	Mauritio	M	Zeb1, 2, 3, 5	07.08.2002	Below Nest site	Zeburu	4
			Zeb28, 31, 32, 34	17.06.2003		Zeburu	4
			Zeb8, 10, 11,	07.08.2003	Horst	Zeburu	3
BG279	Gelas	F	Van1	25.05.2003	-	Termignon	1
			Van3, 5, 6, 9	No date	-	Termignon	4
			Van10-12	24.7.2005	under nest No 3	Termignon	3
			Van14, Van15	21.7.2006	Below nest	Termignon	2
BG283	Tell	M	Sin15	13.10.2002	Sleeping place	Sinestra	1
			Bo29, Bo31	09.08.2005	Sleeping place	Bormio	2
			Bo34	20.6.2006	50m from active nest site	Braulio/Bormio	1
BG285	Sina	F	Sin9 -Sin14,16	13.10.2002	Sleeping place	Sinestra	7
			Sin21, 24	19.10.2003	Sleeping place	Sinestra	2
BG288	Republic11	F	Ast1	06.03.2003	New colouring place	Aster	1
			Pasc01,03, 04	04.07.2005	Known colouring zone	Passy	3
			Pasn02, Pasn09	04.07.2005	New colouring zone	Passy	2
BG296	Jackpot 3	M	Pöll1	2003	-	Pölltal	1
BG299	Gildo	F	Deb1	Summer 04	Haut de Cry	Dérborance	1
			Deb2	?	?	Dérborance	1
			Deb06	17.8.2007	Eyrie	Dérborance	1
BG304	Aisone	M	Deb3	?	?	Dérborance	1
			Deb07, Deb09	17.8.2007	Eyrie	Dérborance	2
BG305	Vernante	M	Stura	Summer 01	-	Stura Valley	1
			Bai01	05.06.2005	La bai Graine?	Mercantour	1
BG311	Roubion	M	Maira05	12.9.2006	Maira valley	Alpi-Maritime	1
BG321	Veronika	F	Clo01	9.6.2006	sixt Fer à Cheval	Clos de Sales	1
			Moe02	26.6.2006	?	Moède-RN Passy	1
BG323†	Sempach	F	Bev02, Bev05	29.5./3.6.2006	786.4/158.5	Val Bever	2
BG348	Sereno	M	Pont2	Aug. 2003	Nest	Ponte Bernardo	1
			Pont3, 7	Aug. 2004	Nest	Ponte Bernardo	2
			PAUL1	24.5.2007	Belwo nest site	Saint Paul sur Ubaye	1
BG357	Rätia	F	Sin17, 18, 20	19.10.2003	Sleeping place	Sinestra	3
			Sin27, 29, 30	13.10.2004	Sleeping site	Sinestra	3
			Ser03, Ser05	20.7.2006	Under sleeping place	Serraglio	2
BG359	Pablo	M	Deb04	23.6.2007	?	Dérborance	1
			Deb05, Deb08	17.8.2007	Eyrie	Dérborance	2
BG361	Montblanc	M	Moe01, Moe03	26.6.2006	?	Moède-RN Passy	2
BG364	Louis	M	CHA01, CHA02	16.10.2007	Below eyrie Melna	Val Chamuera	2
BG370	Roure	F	Maira02,04,06,07	12.9.2006	Maira valley	Alpi-Maritime	4
BG393	Stift	F	Sin31	31.8.2007	Below sleeping place	Val Sinestra	1
BG395	Martell	F	Madu1	09.04.2003	-	Madulain	1
			LaS1	March 04	804.300/175.500	Zernez	1
			TAN03, TAN05, TAN06	9.10.2007	Below eyrie	Val Tantermozza	3
BG413	Jausier	F	Van13	3.5.2006	Vallon final des Ardlets d'en Haut	Termignon	1
BG438†	Culan	M	Gun1, Gun2	April 2005	Matschertal	Souttirol	2
BG462	Escalero	F	Fus04	28.07.2005	Fuscherlacke	Hohen Tauern	1
BG464	Natura	F	SNP02, SNP03	20.06.2005	Val Stabelchod	CH Nationalpark	2
BG465	Doraja	F	Glo02, 04, 06	20.7.2005	Glockner	Hohe Tauern	3

Table 4. Overview of genotypes from birds hatched in the wild. Given are the ID (i.e. genotype number), the nest site of their parents, the sex and information about the sampling date and location.

Genotype	Offspring of Pair	Sex	Sampling date	Sampling location	Sampling area	No of samples
GT008	Bargy	M	03.07.2001	Colouring zone	Bargy	2
			No date	Peisey-Nancroix	Vanoise NP	1
			30.9.2006	Rocher de Sétives	Peisey-Nancroix	1
			31.9.2007	Foot of the nest	Pesey-Nancroix	1
GT021	Bargy	M	07.07.2004	Known colouring zone	Passy	1
			07.07.2004	New colouring zone	Passy	2
GT004	Bormio 2000	F	13.08.2000	Below Nest site	Bormio	1
			16.10.2007	Below eyrie Melna	Val Chamuera	2
GT018	Bormio (before 2000)	M	No date	-	Termignon	3
GT020 †	Kötschachtal	M	?	Nest	Kötschachtal	Egg skin
GT019 †	Livigno	F	01.05.1999	Nest Livigno	Livigno	1
GT022	Livigno	F	20.06.2005	Val Stabelchod	CH Nationalpark	3
GT023	Livigno	M	12.10.2005	Sleeping place	Foraz	2
			20.7.2006	Under sleeping place	Serraglio	2
			15.8.2007	Below eyrie	Serraglio	2
			12.10.2005	Sleeping place	Foraz	1
GT024	Livigno	F	12.10.2005	Sleeping place	Foraz	1
GT026	Zebbru	M	28.5.2006	Murtiröt	S-chanf	1
			17.7.2006	Cima dei Bui	CH Nationalpark	1
			29.10.2006	Below eyrie	Val Tantermozza	2
			9.10.2007	Below eyrie	Val Tantermozza	3
GT028	Bargy	M	?	Lancheron à Mayères	Aravis Nord 74	1
			1.9.2007	HS 10 AR 3 passage du Saix	Aravis	1
GT029	Bormio (before 2000)	M	July 2006	Zebbru Valley	Zebbru	1
			16.10.2007	Below active nest	Zebbru	3
GT031	Livigno	F	31.8.2007	Below sleeping place	Val Sinestra	1
GT032	Val d'Isère	F	12.8.2007	Val Savarenche	Aosta	1

Table 5. Overview of all bearded vulture pairs identified between 1998 and 2007. Given are the nest locations, the individual identity (ID) and/or relatedness, and the years in which samples were collected.

Pair	Sex	ID and relatedness	Year(s) of sample collection
Bargy	Male	GT016, offspring of BG022/BG023	2004
	Female	GT007, offspring of BG034/BG035	2000, 2003
Bormio (before 2000)	Male	GT002, offspring of BG150/BG151	1998, 1999, 2001
	Female	GT001, related to BG034/BG054	1998
Bormio (from 2002)	Male	Tell (BG283)	2005, 2006
	Female	GT003, offspring of BG017/BG070	2001, 2002, 2005, 2007
Dérborance	Female	Gildo (BG299)	2004, 2005(?), 2007
	Male	Pablo (BG359)	2007
	Male	Aisone (BG304)	2005(?), 2007
Gastein/Kötschachtal	Male	-	-
Heiligenblut	Female	GT015, offspring of BG019/BG021	2003
	Male	-	-
Heitzing	Female	GT012, offspring of BG019/BG021	No date
	Female	GT013, related to BG034/BG065	2001, 2002, 2005
	Male	GT025, offspring of BG019/BG021	2006
Livigno	Female	GT015, offspring of BG019/BG021	2006
	Male	GT005, offspring of BG051/BG049	1999, 2006
	Female	GT006, offspring of BG017/BG070	2002, 2003, 2007
Maira Valley (Trio)	Male	GT030, offspring of BG051/BG049	2006
	Male	Roubion (BG311)	2006
	Female	Roure (BG370)	2006
Moëde-RN Passy	Male	Montblanc (BG361)	2006
	Female	Veronika (BG321)	2006
	Male	Sereno (BG348)	2003, 2004
Ponte Bernardo	Female	GT017, offspring of BG131/BG132	2003, 2004
	Male	GT023, offspring of pair Livigno	2006, 2007
Serraglio	Female	Rätia (BG357)	2006
	Male	Tell (BG283)	2002
Sinestra (before 2004)	Female	Sina (BG285)	2002, 2003
	Male	GT002, offspring of BG150/BG151	2004
Sinestra (from 2004)	Female	Rätia (BG357)	2003, 2004
	Male	GT018, offspring of GT001/GT002	No date
Termignon	Female	Gelas (BG279)	2003
	Male	Louis (BG364)	2007
Val Chamuera	Female	GT004, offspring of GT002/GT003	2007
	Male	GT009, offspring of BG009/BG041	2001, 2005
Val d'Isère	Female	GT010, offspring of BG019/BG021	2001, 2005
	Male	GT026, offspring of GT001/BG264	2006, 2007
Val Tantermozza	Female	Martell (BG395)	2007
	Male	Mauritio (BG264)	2002, 2003
Zebru	Male	GT029, offspring of GT001/GT002	2006, 2007
	Female	GT001, related to BG034/BG054	2002, 2003, 2004, 2007