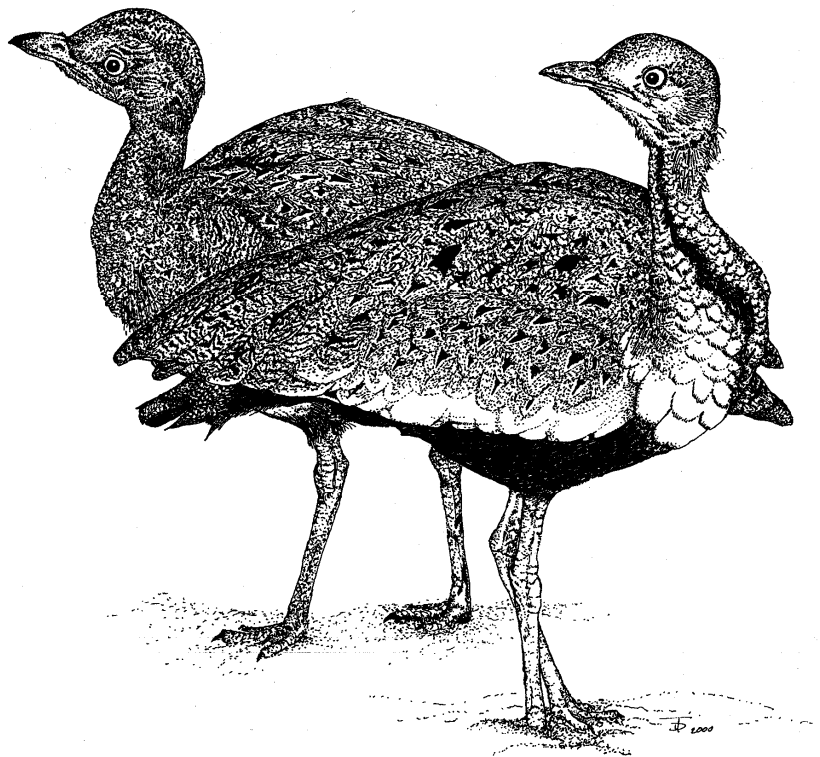


2010  
INTERNATIONAL  
STUDBOOK  
FOR THE  
BUFF-CRESTED  
BUSTARD  
( *Eupodotis gindiana* )



Smithsonian  
National Zoological Park

2010  
**INTERNATIONAL STUDBOOK**  
for the  
**BUFF-CRESTED BUSTARD**

*(Eupodotis gindiana)*

**Sara Hallager, Studbook keeper**

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## INTRODUCTION

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The formation of the North American Regional Studbook for buff-crested bustards *Eupodotis gindiana* was approved by WCMC (Wildlife Conservation and Management Committee) in August 1993. WCMC operates under AZA (American Zoo's and Aquariums). The conversion of this studbook to an International level was approved initially by WCMC in December 1995, and finally by the World Conservation Union/Species Survival Commission (IUCN/SSC) and the International Union of Directors of Zoological Gardens-the World Zoo Organization (IUDZG-WZO) in May 1996.

The buff-crested bustard studbook documents all known buff-crested bustards that live or once lived in institutions worldwide. This includes both zoos and the private sector. To date 133.129.92 (354) birds have been reported and documented in the studbook. The complete Historical Studbook was last distributed in 2007. The Living Studbook currently records 33.24.2 (59) birds in 17 institutions.

When the subspecies of the individual bird is known, it is reported in a separate column in the studbook. The subspecies listing is based on the capture location of the bird if it has been reported. With the exception of one individual, all specimens are reported to be the *gindiana* subspecies. All descendents of wild caught birds, of which the capture location was known for both parents, have a subspecies designation as well.

Hatch dates for wild caught birds are estimated to the year, unless facilities have provided information otherwise. The hatch date for wild caught birds is based on the year the bird arrived in a zoo. It was assumed that young birds were captured for zoos or private individuals. The assumption was also made that the dealer involved did not hold the bird for an extended period of time. Thus, the hatch date for wild caught birds is generally one to two years before the bird was captured, unless a facility has provided information to the contrary.

Dates listed for transfers to dealers are also estimated. The assumption was made that a lack of adequate holding facilities in the place of capture, prompted to dealer not to hold the bird for an extended period of time. Thus, dates for transfers from dealers to zoos or private individuals are generally the same year the bird arrived into a particular facility.

The abbreviation MULT is used when there is more than one possible dam or sire.

---

## **STUDBOOK DISCLAIMER**

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## STUDBOOK FORMAT

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The buff crested bustard studbook uses the Single Population Animal Record Keeping System (SPARKS) program, version 1.54

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*STUD #:* Birds permanent studbook number. Each institution should enter the studbook number into ARKS for all animals that they have held.

*SEX:* M= male      F= female      U= unknown

*HATCH DATE:* Birds hatch date. At tilde mark '~' before the date indicates an approximate date. '?' indicates that the hatch date is unknown.

*SIRE and DAM:* Studbook numbers for the birds sire and dam. 'Unk' indicates that either or both are unknown. 'Mult' indicates that there are several possible sires and/or dams.

*LOCATION:* The facility that has acquired the bird. An alphabetical listing of current holding locations as well as all historic holding sites including addresses is included at the end of the studbook. If a bird is no longer traceable, 'ltf' (lost to follow up) will appear to the right of the last known location.

*DATE:* The date on which the bird arrived or left a facility. A tilde '~' mark indicates that the arrival date is approximate. 'Unk' indicates that the date is unknown.

*LOCAL ID:* The facilities local identification number (often the ISIS number as well).

*EVENT:* Capture, Birth, Transfer (physical move with corresponding ownership change), Loan (physical move with no ownership change), Death.

*REARING:* Indicates whether the bird was parent or handreared, or if rearing method is unknown.

*SUBSPECIES:* Birds subspecific status. If no subspecies is indicated, then the birds capture location could not be determined. Offspring from wild caught birds, of which the capture location for both parents is known, have a subspecies designation as well.

---

# LIVING STUDBOOK

---

Dates: 10/05/2010 <= date

Report ordered by: current/last location (geographic)

```
=====
Stud # | Sex | Hatch Date | Sire | Dam | Location | Date | Local ID | Event |
=====
```

**Birmingham Zoo, Birmingham, Alabama, USA**

```
310   M           ~ 2002   WILD   WILD   TANZANIA           ~ 2002   NONE   Capture
                                           KROESEN   30 Dec 2002   _____   Transfer
                                           NY BRONX   4 Feb 2003   B03007   Transfer
                                           BIRMINGHM 18 Mar 2003   B03002   Transfer
```

Totals: 1.0.0 (1)

**Fresno Chaffee Zoo, Fresno, California, USA**

```
303   M           ~ 2002   WILD   WILD   TANZANIA           ~ 2002   NONE   Capture
                                           KROESEN   30 Dec 2002   _____   Transfer
                                           NY BRONX   4 Feb 2003   B03005   Transfer
                                           DENVER     2 Apr 2003   A02499   Transfer
                                           FRESNO     28 May 2008   280161   Transfer
```

```
311   F           ~ 2002   WILD   WILD   TANZANIA           ~ 2002   NONE   Capture
                                           KROESEN   30 Dec 2002   _____   Transfer
                                           NY BRONX   4 Feb 2003   B03017   Transfer
                                           BIRMINGHM 18 Mar 2003   B03003   Transfer
                                           FRESNO     26 Oct 2009   290207   Transfer
```

Totals: 1.1.0 (2)

**Oakland Zoo, Oakland, California, USA**

```
321   M   12 Jul 2004   33   280   SD-WAP   12 Jul 2004   804217   Hatch
```

FRESNO	24 Feb 2005	250007	Transfer
DENVER	28 May 2008	A08139	Transfer
OAKLAND	17 Nov 2009	2552	Transfer

Totals: 1.0.0 (1)

---

**San Diego Wild Animal Park, Escondido, California, USA**

277	M	19 Jun 2001	33	11	SD-WAP	19 Jun 2001	801265	Hatch
319	F	15 Jun 2004	33	280	SD-WAP	15 Jun 2004	804176	Hatch
354	M	30 Mar 2009	309	315	SD-WAP	30 Mar 2009	809036	Hatch

Totals: 2.1.0 (3)

---

**Miami Metrozoo, Miami, Florida, USA**

320	F	29 Jun 2004	33	280	SD-WAP	29 Jun 2004	804199	Hatch
					SEA WORLD	17 Aug 2005	BCB002	Transfer
					METROZOO	28 Aug 2008	B80265	Transfer
334	M	12 Apr 2007	312	294	ST LOUIS	12 Apr 2007	105711	Hatch
					METROZOO	12 Mar 2008	B80045	Transfer

Totals: 1.1.0 (2)

---

**Saint Louis Zoo, St Louis, Missouri, USA**

294	F	31 May 2002	6	7	DALLAS	31 May 2002	02E374	Hatch
					ST LOUIS	24 Oct 2002	101992	Transfer
312	M	14 Aug 2003	33	280	SD-WAP	14 Aug 2003	803196	Hatch
					ST LOUIS	23 Jun 2004	103526	Transfer

Totals: 1.1.0 (2)

---



**Albuquerque Biological Park, Albuquerque, New Mexico, USA**

332	M	12 May 2007	324	300	HOUSTON	12 May 2007	22959	Hatch
					RIO GRAND	24 Jun 2008	B08023	Transfer
339	F	30 Nov 2007	23	298	SAN ANTON	30 Nov 2007	N07051	Hatch
					RIO GRAND	28 Aug 2008	B08032	Transfer

Totals: 1.1.0 (2)

---

**Cincinnati Zoo & Botanical Garden, Cincinnati, Ohio, USA**

313	M	26 Aug 2003	33	280	SD-WAP	26 Aug 2003	803215	Hatch
					CINCINNAT	3 Jun 2004	204021	Transfer

Totals: 1.0.0 (1)

---

**Columbus Zoo and Aquarium, Powell, Ohio, USA**

209	M	19 Jul 1997	41	53	SAN ANTON	19 Jul 1997	970751	Hatch
					TOLEDO	18 Nov 1998	981630	Transfer
					COLUMBUS	14 Apr 2006	106011	Transfer

Totals: 1.0.0 (1)

---

**Philadelphia Zoo, Philadelphia, Pennsylvania, USA**

345	M	31 May 2008	324	300	HOUSTON	31 May 2008	24167	Hatch
					PHILADELP	22 Jan 2009	205660	Transfer

Totals: 1.0.0 (1)

---

**Riverbanks Zoo & Garden, Columbia, South Carolina, USA**

336	F	19 Jul 2007	324	300	HOUSTON	19 Jul 2007	23184	Hatch
					COLUMBIA	27 Feb 2008	9935	Transfer

Totals: 0.1.0 (1)

---

**Dallas Zoo, Dallas, Texas, USA**

6	M	~ 1985	WILD	WILD	TANZANIA BELLBIRD DALLAS	~ 1987 ~ 1987 5 Feb 1987	NONE _____ 874884	Capture Transfer Transfer
296	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX DALLAS	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03019 03E639	Capture Transfer Transfer Transfer
325	F	22 Jul 2005	6	7	DALLAS	22 Jul 2005	05F906	Hatch
342	M	3 Jun 2008	296	325	DALLAS	3 Jun 2008	08J116	Hatch
343	M	31 Jul 2008	296	325	DALLAS	31 Jul 2008	08J327	Hatch
352	F	23 May 2009	296	325	DALLAS	23 May 2009	09J877	Hatch
353	M	25 Sep 2009	296	325	DALLAS	25 Sep 2009	09K003	Hatch
Totals: 5.2.0 (7)								

**Houston Zoo Inc, Houston, Texas, USA**

300	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX HOUSTON	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03016 20386	Capture Transfer Transfer Transfer
324	M	2 May 2005	297	298	SAN ANTON HOUSTON	2 May 2005 3 Nov 2005	Y05002 22130	Hatch Transfer
347	?	29 Jun 2009	324	300	HOUSTON	29 Jun 2009	24966	Hatch
348	F	10 Jun 2009	324	300	HOUSTON	10 Jun 2009	24935	Hatch
Totals: 1.2.1 (4)								

-----

**Phoenix Zoo, Phoenix, AZ, USA**

349 M 29 Jun 2009 324 300 HOUSTON 29 Jun 2009 24966 Hatch  
 Totals: 1.0.0 (1)

-----

**San Antonio Zoological Gardens & Aquarium, San Antonio, Texas, USA**

23	M	14 Aug 1989	2	4	SANDIEGOZ	14 Aug 1989	489080	Hatch
					BALTIMORE	31 Aug 1990	900806	Transfer
					HOUSTON	15 Jul 1997	16999	Transfer
					SAN ANTON	11 Jul 2001	L01067	Transfer
297	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03006	Transfer
					SAN ANTON	18 Mar 2003	M03017	Transfer
298	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03015	Transfer
					SAN ANTON	18 Mar 2003	M03018	Transfer
301	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03008	Transfer
					WILD WRLD	18 Mar 2003	7012	Transfer
					SAN ANTON	12 Jan 2010	J10026	Transfer
302	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03018	Transfer
					WILD WRLD	18 Mar 2003	7013	Transfer
					SAN ANTON	12 Jan 2010	J10027	Transfer

314	F	30 Mar 2004	297	298	SAN ANTON	30 Mar 2004	M04041	Hatch
323	M	18 Feb 2005	6	7	DALLAS	18 Feb 2005	05F486	Hatch
					SAN ANTON	20 Apr 2006	A06041	Transfer
341	M	21 Apr 2008	297	298	SAN ANTON	21 Apr 2008	A08069	Hatch
344	F	21 Jul 2008	297	298	SAN ANTON	21 Jul 2008	L08063	Hatch
350	F	~ 8 Jan 2009	23	298	SAN ANTON	~ 8 Jan 2009	L09037	Hatch
351	F	26 Aug 2009	323	314	SAN ANTON	26 Aug 2009	G09034	Hatch
356	?	2 Apr 2010	23	298	SAN ANTON	2 Apr 2010	A10004	Hatch

Totals: 5.6.1 (12)

-----

**Al Ain Wildlife Park and Resort, Al Ain, Abu Dhabi, United Arab Emirates**

81	M	~ 1 Jan 1992	73	MULT	AL AIN	~ 1 Jan 1992	_____	Hatch
					NARC	1 Jun 1993	466	Transfer
					AL AIN	15 Jun 2003	466	Transfer
93	M	~ 1 Jan 1991	73	MULT	AL AIN	~ 1 Jan 1991	_____	Hatch
					NARC	1 Jun 1993	453	Transfer
					SWEIHAN	29 Aug 1995	453	Transfer
					NARC	5 Nov 1996	453	Transfer
					AL AIN	15 Jun 2003	453	Transfer
103	M	~ 1 Jan 1992	73	MULT	AL AIN	~ 1 Jan 1992	_____	Hatch
					NARC	1 Jun 1993	464	Transfer
					SWEIHAN	29 Aug 1995	464	Transfer
					NARC	5 Nov 1996	464	Transfer
					AL AIN	15 Jun 2003	464	Transfer
110	M	5 Jun 1994	93	96	NARC	5 Jun 1994	651	Hatch

					AL AIN	15 Jun 2003	651	Transfer
123	M	25 Apr 1995	73	75	NARC	25 Apr 1995	735	Hatch
					AL AIN	15 Jun 2003	735	Transfer
143	M	18 Mar 1996	73	75	NARC	18 Mar 1996	854	Hatch
					AL AIN	15 Jun 2003	854	Transfer
147	M	25 Jun 1996	73	75	NARC	25 Jun 1996	886	Hatch
					AL AIN	15 Jun 2003	886	Transfer
153	F	21 Sep 1996	73	75	NARC	21 Sep 1996	929	Hatch
					AL AIN	15 Jun 2003	929	Transfer
232	M	4 Jun 1999	98	126	NARC	4 Jun 1999	1361	Hatch
					AL AIN	15 Jun 2003	1361	Transfer
235	F	26 Apr 1999	187	72	NARC	26 Apr 1999	1366	Hatch
					AL AIN	15 Jun 2003	1366	Transfer
239	F	10 May 1999	98	126	NARC	10 May 1999	1372	Hatch
					AL AIN	15 Jun 2003	1372	Transfer
245	F	4 Jul 1999	98	126	NARC	4 Jul 1999	1379	Hatch
					AL AIN	15 Jun 2003	1379	Transfer
246	F	17 Jul 1999	98	126	NARC	17 Jul 1999	1381	Hatch
					AL AIN	15 Jun 2003	1381	Transfer
328	M	~ 2005	UNK	UNK	AL AIN	~ 2005	_____	Hatch
329	F	~ 2005	UNK	UNK	AL AIN	~ 2005	_____	Hatch
355	?	10 May 2009	123	246	AL AIN	10 May 2009	UNK	Hatch
Totals: 9.6.1 (16)								

**National Avian Research Center, Abu Dhabi, United Arab Emirates**

199	M	10 Jun 1997	93	96	NARC	10 Jun 1997	992	Hatch
203	F	13 Jul 1997	98	75	NARC	13 Jul 1997	996	Hatch

Totals: 1.1.0 (2)

---

**TOTALS: 33.23.3 (59)**

**17 Institutions**

---

# CENSUS REPORT

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Year as of 31 Dec	Specimen Counts	Observed Lambda	
		Annual	Geometric Mean
2010	33.23.3 (59)	1.00	
2009	33.25.2 (60)	1.03	1.02 (last 2 yrs)
2008	34.24.0 (58)	0.98	1.01 (last 3 yrs)
2007	32.27.0 (59)	1.00	1.00 (last 4 yrs)
2006	31.27.1 (59)	0.97	1.00 (last 5 yrs)
2005	32.29.0 (61)	1.00	1.00 (last 6 yrs)
2004	31.30.0 (61)	0.82	0.97 (last 7 yrs)
2003	39.35.0 (74)	1.00	0.97 (last 8 yrs)
2002	39.35.0 (74)	1.14	0.99 (last 9 yrs)
2001	34.31.0 (65)	0.92	0.98 (last 10 yrs)
2000	37.32.2 (71)	1.11	0.99 (last 11 yrs)
1999	32.32.0 (64)	0.96	0.99 (last 12 yrs)
1998	38.29.0 (67)	0.85	0.98 (last 13 yrs)
1997	41.38.0 (79)	1.16	0.99 (last 14 yrs)
1996	33.32.3 (68)	1.06	1.00 (last 15 yrs)
1995	33.31.0 (64)	1.25	1.01 (last 16 yrs)
1994	27.24.0 (51)	0.94	1.01 (last 17 yrs)
1993	24.30.0 (54)	0.98	1.00 (last 18 yrs)
1992	24.31.0 (55)	1.17	1.01 (last 19 yrs)
1991	21.26.0 (47)	1.24	1.02 (last 20 yrs)
1990	16.22.0 (38)	1.36	1.04 (last 21 yrs)
1989	13.15.0 (28)	1.47	1.05 (last 22 yrs)
1988	9.10.0 (19)	1.58	1.07 (last 23 yrs)
1987	7.5.0 (12)	4.00	1.13 (last 24 yrs)
1986	3.0.0 (3)	1.00	1.13 (last 25 yrs)
1985	3.0.0 (3)	1.50	1.14 (last 26 yrs)
1984	2.0.0 (2)	0.50	1.11 (last 27 yrs)
1983	3.1.0 (4)	1.00	1.10 (last 28 yrs)
1982	3.1.0 (4)	0.80	1.09 (last 29 yrs)
1981	3.2.0 (5)	0.63	1.07 (last 30 yrs)
1980	4.3.1 (8)	1.00	1.07 (last 31 yrs)
1979	2.2.4 (8)	1.00	1.06 (last 32 yrs)
1978	3.2.3 (8)	1.14	1.07 (last 33 yrs)
1977	3.2.2 (7)	1.17	1.07 (last 34 yrs)
1976	2.2.2 (6)	1.00	1.07 (last 35 yrs)
1975	2.2.2 (6)	0.67	1.05 (last 36 yrs)
1974	4.3.2 (9)	1.00	1.05 (last 37 yrs)
1973	4.3.2 (9)	1.80	1.07 (last 38 yrs)
1972	1.2.2 (5)	1.67	1.08 (last 39 yrs)
1971	1.1.1 (3)	1.50	1.09 (last 40 yrs)
1970	1.1.0 (2)	1.00	1.09 (last 41 yrs)
1969	1.1.0 (2)	1.00	1.08 (last 42 yrs)
1968	1.1.0 (2)	1.00	1.08 (last 43 yrs)
1967	1.1.0 (2)	0.50	1.06 (last 44 yrs)
1966	3.1.0 (4)	2.00	1.08 (last 45 yrs)
1965	2.0.0 (2)	0.67	1.07 (last 46 yrs)

Note: Lambda values include Imports and Exports...

---

## HISTORY OF THE CAPTIVE POPULATION

---

The first edition of the North American Regional Studbook (published in 1995) documented 52 buff-crested bustards held in North American Zoos from 1987- 1995. Buff-crested bustards were not displayed in U.S. zoos until 1987 when the San Diego Zoo and Dallas Zoo acquired their first birds. Ten wild caught birds entered the United States in 1987 (seven were sent to two different zoos, and three went to a private facility). Breeding began shortly after this import with births at San Diego Zoo in 1988 and Dallas Zoo in 1989. In 1993, Knoxville Zoo became the first facility in the U.S. to achieve second generation breeding in this species. In 2003, an import of 17 birds arrived from Tanzania. Breeding from this import commenced in 2004.

The population of buff-crested bustards in Europe dates back to 1965 when the Frankfurt Zoo in Germany imported 3.1 birds from the wild. The first recorded hatching of this species in the world occurred at Frankfurt in 1971. Breeding continued through 1981 at this zoo with a total of 23 chicks hatching. When the breeding male died in 1975, the breeding female was repaired two years later and breeding continued. This new pair subsequently produced 12 chicks. There are no confirmed living descendants from either pair alive today. The first second-generation birth in the world was recorded in 1979 at the Schonbrunner Tiergarten in Vienna, Austria. Currently, there are no known buff-crested bustards maintained in European zoos.

The Al Ain Zoo in Abu Dhabi, United Arab Emirates imported 1.4 birds from the wild in 1988 and breeding began in 1989 with over 100 chicks hatching at this facility. Before his death in 1998 at 12 years of age, the founder male sired 55 offspring. The first second-generation birth at this facility occurred in 1994 and third generation breeding was reached in 1999.

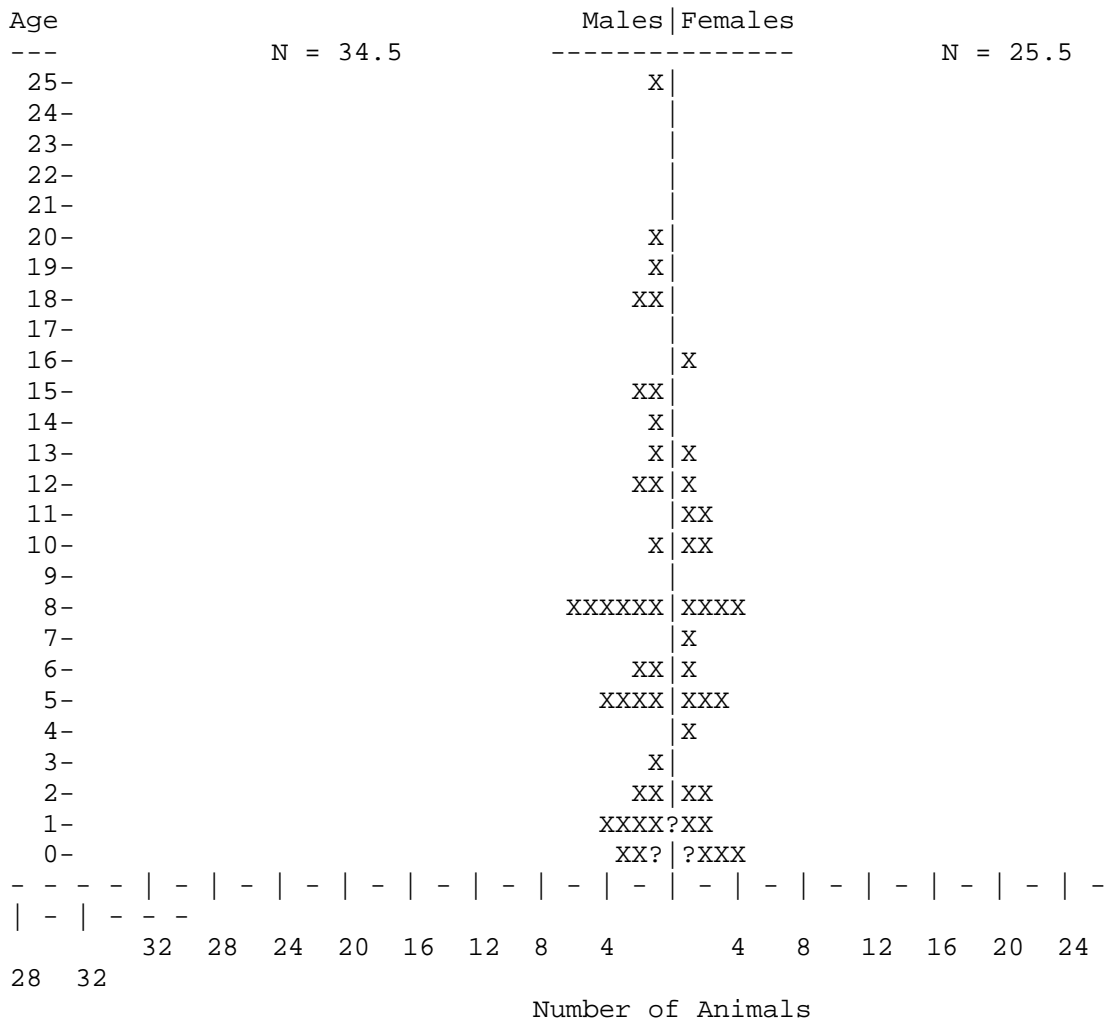
The majority of buff-crested bustards in zoos (97%) have historically been kept in three countries (Germany, United Arab Emirates and United States). However, several other countries have also maintained the species in the past including Austria, Belgium, Saudi Arabia and South Africa.

A total of 354 buff-crested bustards have been recorded in facilities around the world since 1965. Nearly all of these birds are the *gindiana* subspecies. Historically, the population is 89% captive born.

The longevity record for this species in captivity to date is 25 years for a male (now deceased) and 21 years for a female (currently living). Both birds were wild caught however, so their actual ages may be older.



# AGE STRUCTURE



X >>> Specimens of known sex...  
 ? >>> Specimens of unknown sex...

---

## Reproductive Parameters - female

---

Youngest dams at first clutch	Oldest dams at first clutch	Oldest dams to have clutched
126 at age 1Y,10M,2D	47 at age 14Y,10M,7D	7 at age ~20Y
325 at age 1Y,11M,28D	246 at age 9Y,9M,26D	7 at age ~20Y
101 at age ~2Y,2M,6D	67 at age ~8Y,0M	7 at age ~18Y
280 at age 2Y,2M,19D	75 at age ~7Y	7 at age ~17Y
298 at age ~2Y	11 at age 6Y,11M,19D	7 at age ~16Y
53 at age ~2Y,3M	162 at age 6Y,10M,28D	157 at age ~16Y
82 at age ~2Y,4M,3D	8 at age ~6Y	157 at age ~15Y
72 at age ~2Y,4M,13D	214 at age 5Y,11M,27D	157 at age ~15Y
28 at age 3Y,0M,1D	157 at age ~5Y	7 at age ~15Y
27 at age 3Y,1M,13D	204 at age ~5Y	157 at age ~15Y

Median age of females at first reproduction: 4Y,6M,16D  
 Average age of females at first reproduction: 4Y,10M,22D  
 Median age of females at reproduction: ~7Y  
 Average age of females at reproduction: 7Y,4M,25D

Shortest interclutch intervals		Hatch seasonality (clutches)	
Dam	Interval      Offspring	-----	
-----		January:	1    1%
7	16 days between 20 & 21	February:	4    2%
82	17 days between 257 & 264	March:	15   8%
96	17 days between 124 & 127	April:	26   13%
96	18 days between 182 & 184	May:	44   23%
96	18 days between 196 & 199	June:	36   18%
7	19 days between 27 & 30	July:	33   17%
75	19 days between 126 & 129	August:	20   10%
75	19 days between 272 & 273	September:	9    5%
101	19 days between 148 & 151	October:	3    2%
300	19 days between 348 & 347	November:	1    1%
82	20 days between 234 & 237	December:	3    2%
96	20 days between 260 & 254		

Viability:

	Lived > 1 year		Died < 1 year		Died < 30 days	
Rearing:	-----					
Parent (51)	35	69%	5	10%	11	22%
Hand (106)	70	66%	27	25%	9	8%
Foster (1)	0	0%	1	100%	0	0%
Unknown (94)	61	65%	24	26%	9	10%
	-----		-----		-----	
	166	66%	57	23%	29	12%

First hatches to dams at an average age of ~4Y,10M,20D  
 60.6% lived >1 year      30.3% died <1 year      9.1% died <30 days  
       N = 20                                  N = 10                                  N = 3

Subsequent hatches to dams at an average age of ~7Y,9M,12D  
 66.7% lived >1 year      21.5% died <1 year      11.9% died <30 days  
       N = 146                                  N = 47                                  N = 26

Clutch size	N	
-----		
1	144	73%
2	51	26%
3	2	1%

197 total clutches, mean size is 1.3

---

## Reproductive Parameters - male

---

Youngest sires at first reproduction:

(male's age when dam conceived)

324 at age 1Y,10M,17D  
 120 at age 1Y,11M,20D  
 187 at age 1Y,11M,28D  
 36 at age 2Y,0M,14D  
 297 at age ~2Y  
 81 at age ~2Y,3M,14D  
 103 at age ~2Y,4M,16D  
 296 at age ~2Y  
 321 at age 2Y,9M,6D  
 192 at age 2Y,11M,25D

Oldest sires at first reproduction:

23 at age 18Y,3M,1D  
 123 at age 13Y,11M,29D  
 1 at age ~8Y  
 309 at age ~7Y  
 6 at age ~6Y  
 69 at age 6Y,0M,25D  
 155 at age ~5Y  
 41 at age 5Y,9M,22D  
 205 at age ~5Y  
 98 at age ~5Y,2M,8D

Oldest sires to have reproduced:

23 at age 20Y,7M,3D  
 6 at age ~20Y  
 6 at age ~20Y  
 23 at age 19Y,4M,10D  
 6 at age ~18Y  
 23 at age 18Y,3M,1D  
 6 at age ~17Y  
 6 at age ~16Y  
 6 at age ~15Y  
 123 at age 13Y,11M,29D

Median age of males at first reproduction: ~3Y,10M,11D

Average age of males at first reproduction: 4Y,9M,3D

Median age of males at reproduction: 6Y,8M,22D

Average age of males at reproduction: 7Y,0M,5D

(all ages are at dam conception)

Oldest dozen males:

- 69 Captive hatched Died at VIENNA at age of 17Y,7M,30D
- 98 Captive hatched Died at AL AIN at age of ~16Y,9M,25D
- 166 Captive hatched Died at FRANKFURT at age of 14Y,7M,2D
- 33 Captive hatched Died at SD-WAP at age of 13Y,8M,21D
- 2 Wild hatched Died at SANDIEGOZ at age of ~13Y
- 41 Captive hatched Died at SAN ANTON at age of 12Y,3M,30D
- 73 Wild hatched Died at NARC at age of ~12Y
- 34 Captive hatched Died at DALLAS at age of 11Y,8M,16D
- 106 Captive hatched Died at AL AIN at age of ~11Y,6M,4D
- 10 Wild hatched Died at WALDON W at age of ~10Y
- 155 Wild hatched Died at FRANKFURT at age of ~10Y
- 183 Captive hatched Died at AL AIN at age of 9Y,6M,3D

Oldest dozen living males:

- 6 Wild hatched At DALLAS at age of ~25Y
- 23 Captive hatched At SAN ANTON at age of 20Y,9M,0D
- 93 Captive hatched At AL AIN at age of ~19Y,4M,12D
- 103 Captive hatched At AL AIN at age of ~18Y,4M,12D
- 81 Captive hatched At AL AIN at age of ~18Y,4M,12D
- 110 Captive hatched At AL AIN at age of 15Y,11M,8D
- 123 Captive hatched At AL AIN at age of 15Y,0M,19D
- 143 Captive hatched At AL AIN at age of 14Y,1M,26D
- 147 Captive hatched At AL AIN at age of 13Y,10M,18D
- 199 Captive hatched At NARC at age of 12Y,11M,2D
- 209 Captive hatched At COLUMBUS at age of 12Y,9M,24D
- 232 Captive hatched At AL AIN at age of 10Y,11M,8D

Oldest dozen females:

- 7 Wild hatched Died at DALLAS at age of ~21Y
- 20 Captive hatched Died at DALLAS at age of 17Y,7M,14D
- 96 Captive hatched Died at AL AIN at age of ~17Y,6M,8D
- 157 Wild hatched Died at FRANKFURT at age of ~17Y
- 82 Captive hatched Died at AL AIN at age of ~17Y,0M,15D
- 47 Captive hatched Died at FRESNO at age of 16Y,10M,22D
- 11 Captive hatched Died at SD-WAP at age of 16Y,0M,28D
- 101 Captive hatched Died at AL AIN at age of ~16Y,0M,10D
- 27 Captive hatched Died at KNOXVILLE at age of 15Y,7M,7D
- 75 Wild hatched Died at NARC at age of ~14Y
- 4 Wild hatched Died at SANDIEGOZ at age of ~14Y
- 162 Captive hatched Died at VIENNA at age of 12Y,2M,24D

Oldest dozen living females:

- 91 Captive hatched At SWEIHAN at age of 16Y,4M,8D
- 153 Captive hatched At AL AIN at age of 13Y,7M,21D
- 203 Captive hatched At NARC at age of 12Y,9M,30D
- 235 Captive hatched At AL AIN at age of 11Y,0M,17D
- 239 Captive hatched At AL AIN at age of 11Y,0M,3D
- 245 Captive hatched At AL AIN at age of 10Y,10M,9D
- 246 Captive hatched At AL AIN at age of 10Y,9M,26D
- 311 Wild hatched At FRESNO at age of ~8Y
- 302 Wild hatched At SAN ANTON at age of ~8Y
- 300 Wild hatched At HOUSTON at age of ~8Y
- 298 Wild hatched At SAN ANTON at age of ~8Y
- 294 Captive hatched At ST LOUIS at age of 7Y,11M,11D

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## NATURAL HISTORY

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### RANGE AND HABITAT

The buff-crested bustard *Eupodotis gindiana* is found in East Africa from Ethiopia and Somalia south through Kenya to northeastern Uganda and central Tanzania. Savile's bustard (*Eupodotis savilei*) is found from Senegal east to Sudan. *Eupodotis ruficrista* or Red-crested bustard is found in southern Angola, Namibia through Botswana, Zambia, southeast to Mozambique, and northern South Africa.

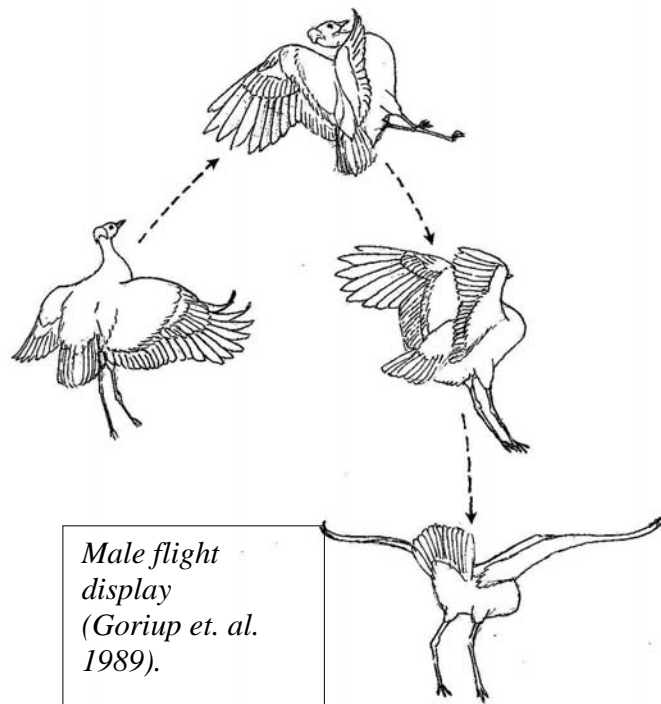
Buff-crested bustards live in arid to semi-arid habitats that offer some cover. They are rarely found in open areas. In Kenya and parts of East Africa, they are found at elevations of 1500 m or less. Movements in response to rainfall and food supply have been recorded, but the species is not migratory in the true sense.

### DESCRIPTION

The *Eupodotis ruficrista* male has a gray crown with pink-brown feathers at the nape, hence the name, 'red-crested bustard'. The head and neck are gray-buff colored with a wide black stripe running down the throat. The underparts are light brown with black and buff mottlings. The tail is white with dark brown vermiculations and has bars. The primaries are dark brown. *Eupodotis gindiana* has more reddish underparts. It also has more of a buffish colored crest, hence the name 'buff-crested bustard' and an extended stripe down the neck. There are no bars on the tail, and more buff coloration on the wings. *Eupodotis savilei* is smaller, has an olive colored crown, and has more black on the undersides towards the neck. The upper feathers contain light orange-brown coloration's.

The females of all subspecies have brown heads, a much reduced crest, and are buff colored in the throat, chin, and breast area. Weights for males range from 550g (*ruficrista*) to 900g (*gindiana*).

Bustards have a poor fossil record. The earliest bustard *Palaeotis weigelti* is from the middle Eocene with a rapid early radiation. Living bustard species last shared an ancestor 22-26



million ago. The evolution of the group has been subject to much speculation throughout the years. Since Peters 1934 classification of the modern bustards into 25 species in 11 genera, very little taxonomic changes have occurred in the family except for a slight reduction in the total number of species and genera (e.g. Osborne 1984, Urban 1986 and Johnsgard 1991). Previous thoughts on bustard evolution (Wood and Schneel 1986) were based on anatomical characteristics and male display structures. In 1993, Pitra et. al. looked at the phylogenetic relationships of bustards using mitochondrial DNA sequencing techniques. Pitra found 1) a Miocene origin for the family 2) sister relationships between several genera such as *Ardeotis* and *Neotis* 3) the genus *Eupodotis* may be polyphyletic and 4) the currently delimited genera *Ardeotis* and *Neotis* do not form independent monophyletic lineage's.

Taxonomists currently debate whether to regard the three populations as one species, two species, or three species. Some authorities suggest that the populations should be regarded as three separate species based on the differences in vocalizations given by the male during display. For the purposes of the studbook, the three populations are considered one species comprised of three subspecies.

Buff-crested bustards are often referred to by many names. This includes buff-crested florican, crested bustard, red-crested korhaan, bush korhaan, and the Afrikaans name boskorhaan. In the field, this is the only bustard with black underparts that lacks white at the base of the primaries. It is also the smallest East African bustard.

Like all bustards, buff-crested bustards have no preen gland. Instead of using an oil gland to keep their feathers clean, they employ dust bathing. Their feathers contain light sensitive porphyrins, which gives their feathers a pink tinge at the base. As with all bustards, they lack a hind toe.

### DIET

Buff-crested bustards are omnivorous birds and they have a well-developed caeca indicating their dependence on plant material. Insects form a large part of their diet especially when they are chicks. Insects reported consumed include beetles, beetle larva, grasshoppers, ants, and centipedes. They also eat berries, fruits, and seeds. Small vertebrates may be occasionally consumed. Buff-crested bustards are one of the few species of birds known to drink water using a sucking action rather than scooping it as most birds do.

### REPRODUCTION

Buff-crested bustards are generally found alone. Reports of pairs may pertain to females with older chicks. There is no indication of permanent pair bonding. In Kenya, breeding season starts around March and extends to August. In Uganda, breeding runs from December through March, while in Ethiopia and Somalia breeding commences in March and runs through June.

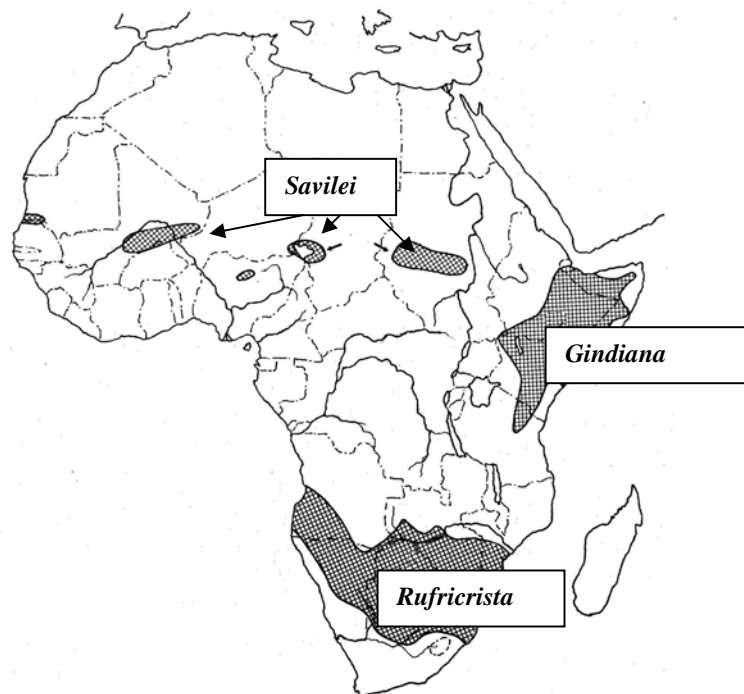
The breeding display of the male is quite spectacular, and is of the 'Aerial' type. This aerial display has not been recorded for Savile's bustard. The male begins the display by calling in an ever increasing volume. It is thought that males call from traditional display areas. The calls differ between the subspecies and have been described in detail by Chappuis, Erare, and Morel (1979). All three subspecies are the only bustards known to produce whistles. After calling, the male flies into the air

upwards of 30m and then turns on his back with his feet facing up. He next flips over and falls to the ground with his wings spread out. The display is geared towards attracting a female and may also define territories among males. When a female is encountered, the feathers on the crown of the male are erected to form a crest. The throat and neck feathers are puffed out. After copulation, the male leaves and resumes displaying to attract another female.

The female makes no nest in the traditional sense. Rather, the eggs are laid on the ground in a shallow scrape. Often, the nest is near a clump of grass. The usual clutch is two eggs. The eggs are olive brown to pinkish-buff with dark brown marks. Incubation periods range from 19-21 days. The chicks are precocial and able to follow their mother around a day or so after hatching. Fledging occurs at about four or five weeks, although the young often remain with the female for several months after this event. In 1992, Dallas Zoo first reported that chicks were observed being carried by their mothers under her wing (Falzone, 1992). This occurred most often when the female sensed danger. Sexual maturity has been documented in a captive hatched female that bred at the age of 1 year/10 months at the National Avian Research Center in Abu Dhabi. Longevity records in captivity approach 20 years.

#### STATUS AND CONSERVATION

All three subspecies are still common in Africa, although the distribution of Savile's bustard is somewhat irregular. None are considered globally threatened. The species is listed on Appendix II of CITES. *Eupodotis gindiana* breeds well in captivity, as evidenced by the 315 births recorded in the studbook.





## Births from 2007 – Apr 2010

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
330	M	8 May 2007	321	47	FRESNO SEA WORLD	8 May 2007 7 Feb 2008 21 Jun 2008	270178 BCB003	Hatch Transfer Death
331	F	8 Apr 2007	324	300	HOUSTON	8 Apr 2007 1 Nov 2007	22909	Hatch Death
332	M	12 May 2007	324	300	HOUSTON RIO GRAND	12 May 2007 24 Jun 2008	22959 B08023	Hatch Transfer
333	F	1 Jun 2007	297	298	SAN ANTON	1 Jun 2007 26 Nov 2008	U07001	Hatch Death
334	M	12 Apr 2007	312	294	ST LOUIS METROZOO	12 Apr 2007 12 Mar 2008	105711 B80045	Hatch Transfer
336	F	19 Jul 2007	324	300	HOUSTON COLUMBIA	19 Jul 2007 27 Feb 2008	23184 9935	Hatch Transfer
339	F	30 Nov 2007	23	298	SAN ANTON RIO GRAND	30 Nov 2007 28 Aug 2008	N07051 B08032	Hatch Transfer
341	M	21 Apr 2008	297	298	SAN ANTON	21 Apr 2008	A08069	Hatch
342	M	3 Jun 2008	296	325	DALLAS	3 Jun 2008	08J116	Hatch
343	M	31 Jul 2008	296	325	DALLAS	31 Jul 2008	08J327	Hatch
344	F	21 Jul 2008	297	298	SAN ANTON	21 Jul 2008	L08063	Hatch
345	M	31 May 2008	324	300	HOUSTON PHILADELP	31 May 2008 22 Jan 2009	24167 205660	Hatch Transfer
346	?	20 Jul 2007	296	325	DALLAS	20 Jul 2007 30 Jul 2007	07H405	Hatch Death
347	?	29 Jun 2009	324	300	HOUSTON	29 Jun 2009	24966	Hatch
348	F	10 Jun 2009	324	300	HOUSTON	10 Jun 2009	24935	Hatch
349	M	29 Jun 2009	324	300	HOUSTON	29 Jun 2009	24966	Hatch
350	F	~ 8 Jan 2009	23	298	SAN ANTON	~ 8 Jan 2009	L09037	Hatch
351	F	26 Aug 2009	323	314	SAN ANTON	26 Aug 2009	G09034	Hatch
352	F	23 May 2009	296	325	DALLAS	23 May 2009	09J877	Hatch
353	M	25 Sep 2009	296	325	DALLAS	25 Sep 2009	09K003	Hatch
354	M	30 Mar 2009	309	315	SD-WAP	30 Mar 2009	809036	Hatch
355	?	10 May 2009	123	246	AL AIN	10 May 2009	UNK	Hatch
356	?	2 Apr 2010	23	298	SAN ANTON	2 Apr 2010	A10004	Hatch

TOTALS: 10.9.4 (23)

## Deaths from 2007 – Apr 2010

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
20	F	22 Jul 1989	5	7	DALLAS	22 Jul 1989	896584	Hatch
					PALM DES	7 Dec 1990	290056	Transfer
					HOUSTON	12 Aug 1997	17045	Transfer
					DALLAS	4 Oct 2001	896584	Transfer
								Death
47	F	4 Jul 1992	2	4	SANDIEGOZ	4 Jul 1992	392563	Hatch
					FRESNO	1 Jul 1993	6787	Transfer
						22 May 2009		Death
70	F	14 Sep 1997	33	11	SD-WAP	14 Sep 1997	897406	Hatch
					CINCINNAT	3 Jun 2004	204022	Transfer
						1 May 2008		Death
82	F	~ 1 Jan 1992	73	MULT	AL AIN	~ 1 Jan 1992		Hatch
					NARC	1 Jun 1993	463	Transfer
					AL AIN	15 Jun 2003	463	Transfer
						11 Jan 2009		Death
96	F	~ 1 Jan 1990	73	MULT	AL AIN	~ 1 Jan 1990		Hatch
					NARC	1 Jun 1993	456	Transfer
					SWEIHAN	29 Aug 1995	456	Transfer
					NARC	5 Nov 1996	456	Transfer
					AL AIN	15 Jun 2003	456	Transfer
				6 Jul 2007		Death		
98	M	~ 1 Apr 1992	73	MULT	AL AIN	~ 1 Apr 1992		Hatch
					NARC	1 Jun 1993	458	Transfer
					AL AIN	15 Jun 2003	458	Transfer
						21 Jan 2009		Death
101	F	~ 1 Apr 1992	73	MULT	AL AIN	~ 1 Apr 1992		Hatch
					NARC	1 Jun 1993	461	Transfer
					AL AIN	15 Jun 2003	461	Transfer
						7 Apr 2008		Death
238	F	9 May 1999	187	82	NARC	9 May 1999	1371	Hatch
					AL AIN	15 Jun 2003	1371	Transfer
						17 Mar 2010		Death
261	M	23 May 2000	98	126	NARC	23 May 2000	1847	Hatch
					AL AIN	15 Jun 2003	1847	Transfer
						23 Jan 2009		Death
273	M	3 Aug 2000	192	75	NARC	3 Aug 2000	1901	Hatch
					AL AIN	15 Jun 2003	1901	Transfer
						26 Jan 2009		Death
281	M	31 Jul 2000	98	126	NARC	31 Jul 2000	1899	Hatch
					AL AIN	15 Jun 2003	1899	Transfer
						8 Mar 2007		Death
295	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03009	Transfer
					DALLAS	18 Mar 2003	03E638	Transfer
						27 Feb 2007		Death
304	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03013	Transfer
					DENVER	2 Apr 2003	A02500	Transfer
						27 Dec 2007		Death

305	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX DENVER	~ 2002 30 Dec 2002 4 Feb 2003 2 Apr 2003 26 Feb 2008	NONE _____ B03014 A02501	Capture Transfer Transfer Death
309	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX STCATHERN SD-WAP	~ 2002 30 Dec 2002 4 Feb 2003 1 May 2003 16 Feb 2005 14 Dec 2009	NONE _____ B03012 B03012 805018	Capture Transfer Transfer Transfer Death
315	F	4 Jul 2004	297	298	SAN ANTON SD-WAP	4 Jul 2004 21 Apr 2005 28 Jun 2009	L04002 805065	Hatch Transfer Death
326	?	30 Dec 2006	312	294	ST LOUIS	30 Dec 2006 19 Jan 2007	105617	Hatch Death
327	M	~ 2005	UNK	UNK	AL AIN	~ 2005 31 Dec 2008	_____	Hatch Death
330	M	8 May 2007	321	47	FRESNO SEA WORLD	8 May 2007 7 Feb 2008 21 Jun 2008	270178 BCB003	Hatch Transfer Death
331	F	8 Apr 2007	324	300	HOUSTON	8 Apr 2007 1 Nov 2007	22909	Hatch Death
333	F	1 Jun 2007	297	298	SAN ANTON	1 Jun 2007 26 Nov 2008	U07001	Hatch Death
346	?	20 Jul 2007	296	325	DALLAS	20 Jul 2007 30 Jul 2007	07H405	Hatch Death

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TOTALS: 8.12.2 (22)

## Transfers from 2007 - Apr 2010

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
301	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03008	Transfer
					WILD WRLD	18 Mar 2003	7012	Transfer
					SAN ANTON	12 Jan 2010	J10026	Transfer
302	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03018	Transfer
					WILD WRLD	18 Mar 2003	7013	Transfer
					SAN ANTON	12 Jan 2010	J10027	Transfer
303	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03005	Transfer
					DENVER	2 Apr 2003	A02499	Transfer
					FRESNO	28 May 2008	280161	Transfer
311	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002		Transfer
					NY BRONX	4 Feb 2003	B03017	Transfer
					BIRMINGHM	18 Mar 2003	B03003	Transfer
					FRESNO	26 Oct 2009	290207	Transfer
320	F	29 Jun 2004	33	280	SD-WAP	29 Jun 2004	804199	Hatch
					SEA WORLD	17 Aug 2005	BCB002	Transfer
					METROZOO	28 Aug 2008	B80265	Transfer
321	M	12 Jul 2004	33	280	SD-WAP	12 Jul 2004	804217	Hatch
					FRESNO	24 Feb 2005	250007	Transfer
					DENVER	28 May 2008	A08139	Transfer
					OAKLAND	17 Nov 2009	2552	Transfer
330	M	8 May 2007	321	47	FRESNO	8 May 2007	270178	Hatch
					SEA WORLD	7 Feb 2008	BCB003	Transfer
						21 Jun 2008		Death
332	M	12 May 2007	324	300	HOUSTON	12 May 2007	22959	Hatch
					RIO GRAND	24 Jun 2008	B08023	Transfer
334	M	12 Apr 2007	312	294	ST LOUIS	12 Apr 2007	105711	Hatch
					METROZOO	12 Mar 2008	B80045	Transfer
336	F	19 Jul 2007	324	300	HOUSTON	19 Jul 2007	23184	Hatch
					COLUMBIA	27 Feb 2008	9935	Transfer
339	F	30 Nov 2007	23	298	SAN ANTON	30 Nov 2007	N07051	Hatch
					RIO GRAND	28 Aug 2008	B08032	Transfer
345	M	31 May 2008	324	300	HOUSTON	31 May 2008	24167	Hatch
					PHILADELP	22 Jan 2009	205660	Transfer

TOTALS: 7.5.0 (12)

# BUFF-CRESTED BUSTARD HISTORICAL STUDBOOK

Stud #	Sex	Hatch Date	Sire	Dam	Location	Date	Local ID	Event
1	M	~ 1985	WILD	WILD	AFRICAN WALDON W	~ 1985 ~ 1987 ~ 1999	NONE _____ _____ ltf	Capture Transfer Transfer
2	M	~ 1985	WILD	WILD	AFRICAN ALENTADO SANDIEGOZ	~ 1987 ~ 1987 6 Feb 1987 3 Mar 1998	NONE _____ 387080	Capture Transfer Transfer Death
3	F	~ 1985	WILD	WILD	AFRICAN ALENTADO SANDIEGOZ	~ 1987 ~ 1987 6 Feb 1987 7 Sep 1991	NONE _____ 387081	Capture Transfer Transfer Death
4	F	~ 1985	WILD	WILD	AFRICAN ALENTADO SANDIEGOZ	~ 1987 ~ 1987 6 Feb 1987 12 Feb 1999	NONE _____ 387082	Capture Transfer Transfer Death
5	M	~ 1985	WILD	WILD	TANZANIA BELLBIRD DALLAS	~ 1987 ~ 1987 5 Feb 1987 10 Sep 1990	NONE _____ 874883	Capture Transfer Transfer Death
6	M	~ 1985	WILD	WILD	TANZANIA BELLBIRD DALLAS	~ 1987 ~ 1987 5 Feb 1987	NONE _____ 874884	Capture Transfer Transfer
7	F	~ 1985	WILD	WILD	TANZANIA BELLBIRD DALLAS	~ 1987 ~ 1987 5 Feb 1987 ~15 Mar 2006	NONE _____ 874885	Capture Transfer Transfer Death
8	F	~ 1985	WILD	WILD	AFRICAN	~ 1987	NONE	Capture

					BELLBIRD	~ 1987			Transfer
					DALLAS	5 Feb 1987	874886		Transfer
						26 Jun 1993			Death
9	F	~ 1987	WILD	WILD	AFRICAN	~ 1989	NONE		Capture
					WALDON W	~ 1989			Transfer
						~ 1999		ltf	Transfer
10	M	~ 1987	WILD	WILD	AFRICAN	~ 1989	NONE		Capture
					WALDON W	~ 1989			Transfer
						~ 1997			Death
11	F	12 May 1988	2	4	SANDIEGOZ	12 May 1988	388638		Hatch
					SD-WAP	24 May 1996	388638		Transfer
						5 Jun 2004			Death
12	F	25 May 1988	2	UNK	SANDIEGOZ	25 May 1988	388717		Hatch
					BELLBIRD	2 Nov 1988		ltf	Transfer
13	M	8 Jun 1988	2	UNK	SANDIEGOZ	8 Jun 1988	388825		Hatch
						31 Dec 1988			Death
14	M	15 Aug 1988	2	UNK	SANDIEGOZ	15 Aug 1988	488332		Hatch
						11 Aug 1991			Death
15	M	28 Aug 1988	2	UNK	SANDIEGOZ	28 Aug 1988	488349		Hatch
						25 Jan 1989			Death
16	M	14 May 1989	2	UNK	SANDIEGOZ	14 May 1989	389605		Hatch
					PALM DES	2 Sep 1989	28945		Transfer
						~ 1 Dec 1996			Death
17	F	25 Jun 1989	2	UNK	SANDIEGOZ	25 Jun 1989	389820		Hatch
					PALM DES	2 Sep 1989	28946		Transfer
						24 May 1990			Death
18	?	1 Jul 1989	5	7	DALLAS	1 Jul 1989	896552		Hatch
						4 Jul 1989			Death
19	M	9 Jul 1989	2	UNK	SANDIEGOZ	9 Jul 1989	389953		Hatch
					PALM DES	2 Sep 1989	28947		Transfer
					KNOXVILLE	19 Sep 1990	244		Transfer

						14 Jun 1992	Death
20	F	22 Jul 1989	5	7	DALLAS	22 Jul 1989 896584	Hatch
					PALM DES	7 Dec 1990 290056	Transfer
					HOUSTON	12 Aug 1997 17045	Transfer
					DALLAS	4 Oct 2001 896584	Transfer
						2 Mar 2007	Death
21	F	7 Aug 1989	5	7	DALLAS	7 Aug 1989 896588	Hatch
					BALTIMORE	1 May 1991 910540	Transfer
						8 May 1993	Death
22	F	14 Aug 1989	2	UNK	SANDIEGOZ	14 Aug 1989 489040	Hatch
					KNOXVILLE	31 Aug 1990 239	Transfer
						6 Sep 1991	Death
23	M	14 Aug 1989	2	4	SANDIEGOZ	14 Aug 1989 489080	Hatch
					BALTIMORE	31 Aug 1990 900806	Transfer
					HOUSTON	15 Jul 1997 16999	Transfer
					SAN ANTON	11 Jul 2001 L01067	Transfer
24	M	~ 1990	10	9	WALDON W	~ 1990 _____	Hatch
						~ 1992	Death
25	F	~ 1990	10	9	WALDON W	~ 1990 _____	Hatch
						~ 1992	Death
26	?	9 Apr 1990	5	7	DALLAS	9 Apr 1990 906763	Hatch
						3 May 1990	Death
27	F	23 Jun 1990	5	7	DALLAS	23 Jun 1990 906814	Hatch
					KNOXVILLE	13 Oct 1991 264	Transfer
						25 Jan 2006	Death
28	F	30 Jun 1990	2	UNK	SANDIEGOZ	30 Jun 1990 390756	Hatch
					WALDON W	11 Mar 1992 _____	Transfer
						~ 1994 _____ ltf	Transfer
29	?	5 Jul 1990	5	7	DALLAS	5 Jul 1990 906817	Hatch
						5 Jul 1990	Death
30	F	12 Jul 1990	5	7	DALLAS	12 Jul 1990 906842	Hatch

						30 Jun 1992		Death
31	M	8 Sep 1990	2	UNK	SANDIEGOZ	8 Sep 1990 390857 4 Nov 1992		Hatch Death
32	F	6 Apr 1991	2	UNK	SANDIEGOZ WILD	6 Apr 1991 391214 4 May 1992 391214 ltf		Hatch Transfer
33	M	19 Apr 1991	2	4	SANDIEGOZ SD-WAP	19 Apr 1991 391271 24 May 1996 391271 4 Jan 2005		Hatch Transfer Death
34	M	4 May 1991	2	4	SANDIEGOZ DALLAS	4 May 1991 391384 5 Feb 1992 927465 ~ Jan 2003		Hatch Transfer Death
35	F	17 May 1991	2	UNK	SANDIEGOZ	17 May 1991 391443 24 Feb 1993		Hatch Death
36	M	2 Jul 1991	UNK	UNK	SANDIEGOZ KNOXVILLE	2 Jul 1991 391755 6 Aug 1992 358 7 Jul 1994 358 25 Dec 1999		Hatch Transfer Transfer Death
37	F	9 Jul 1991	2	UNK	SANDIEGOZ SAN ANTON	9 Jul 1991 391701 31 Jan 1992 920143 29 Apr 1992		Hatch Transfer Death
38	M	17 Jul 1991	6	8	DALLAS FRESNO	17 Jul 1991 917173 12 May 1993 6739 23 Nov 1993		Hatch Transfer Death
39	F	21 Jul 1991	2	UNK	SANDIEGOZ	21 Jul 1991 391732 23 Jan 1992		Hatch Death
40	M	13 Aug 1991	2	UNK	SANDIEGOZ	13 Aug 1991 391764 2 Feb 1992		Hatch Death
41	M	24 Aug 1991	2	4	SANDIEGOZ SAN ANTON	24 Aug 1991 391773 31 Jan 1992 920142 20 Dec 2003		Hatch Transfer Death



42	M	8 May 1992	2	4	SANDIEGOZ SAIHATI	8 May 1992 4 Feb 1993 21 Mar 1996	392315 560001	Hatch Transfer Death
43	F	20 May 1992	2	4	SANDIEGOZ SAIHATI KILMER	20 May 1992 14 Feb 1993 ~ May 1998	392355 560002 _____	Hatch Transfer ltf Transfer
44	F	30 May 1992	2	4	SANDIEGOZ CRACID BC	30 May 1992 20 Feb 1994	392378 _____	Hatch ltf Transfer
45	F	15 Jun 1992	2	UNK	SANDIEGOZ	15 Jun 1992 10 Jul 1992	392394	Hatch Death
46	M	25 Jun 1992	2	4	SANDIEGOZ	25 Jun 1992 27 Dec 1993	392557	Hatch Death
47	F	4 Jul 1992	2	4	SANDIEGOZ FRESNO	4 Jul 1992 1 Jul 1993 22 May 2009	392563 6787	Hatch Transfer Death
48	M	18 Jul 1992	2	UNK	SANDIEGOZ CRACID BC	18 Jul 1992 20 Feb 1994	392569 _____	Hatch ltf Transfer
49	M	~ 1993	1	28	WALDON W	~ 1993	_____	ltf Hatch
50	F	~ 1993	1	28	WALDON W	~ 1993 ~ 1997	_____	Hatch Death
51	M	4 Aug 1993	36	27	KNOXVILLE FRESNO	4 Aug 1993 30 Nov 1995 27 Dec 1996	431 950248	Hatch Transfer Death
52	M	28 Apr 1994	2	4	SANDIEGOZ	28 Apr 1994 2 Oct 1994	494074	Hatch Death
53	F	~ Mar 1995	1	9	WALDON W SAN ANTON	~ Mar 1995 5 Mar 1996 24 May 2004	_____ 960305	Hatch Transfer Death
54	M	21 Mar 1995	2	4	SANDIEGOZ HANCOCK D	21 Mar 1995 6 Feb 1997	495020 _____	Hatch Transfer

						10 Feb 1997		Death
55	M	29 Apr 1995	2	4	SANDIEGOZ	29 Apr 1995	495054	Hatch
					HANCOCK D	6 Feb 1997	_____	Transfer
					WALDON W	~ 1998	_____	Transfer
						~ 1998		Death
56	F	30 Apr 1995	33	11	SANDIEGOZ	30 Apr 1995	495057	Hatch
					TOLEDO	26 Sep 1996	961670	Transfer
						19 Feb 1999		Death
57	M	4 Apr 1996	2	4	SANDIEGOZ	4 Apr 1996	496033	Hatch
					HANCOCK D	6 Feb 1997	_____	Transfer
						~ Feb 1997		Death
58	F	~ 1993	1	28	WALDON W	~ 1993	_____	Hatch
						~ Jun 1997		Death
59	F	~ 1991	205	204	WALDON W	~ 1991	_____	Hatch
						~ Jun 1997		Death
60	M	~ May 1996	UNK	UNK	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1996		Death
61	M	~ May 1996	10	9	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1996		Death
62	M	~ May 1996	UNK	UNK	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1996		Death
63	?	~ May 1996	205	204	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1997		Death
64	?	~ May 1996	10	9	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1997		Death
65	?	~ May 1996	10	9	WALDON W	~ May 1996	_____	Hatch
						~ Jun 1997		Death
66	M	~15 Nov 1989	WILD	WILD	AFRICAN PRETORIA	5 Dec 1989	NONE	Capture
						5 Dec 1989	901703	Transfer
						5 Jun 1992		Death

67	F	~ Jun 1990	205	204	WALDON W	~ Jun 1990 _____ ~ 1999 _____		Hatch lrf Transfer
68	F	~ Jul 1997	205	204	WALDON W	~ Jul 1997 _____		lrf Hatch
69	M	28 May 1973	155	157	FRANKFURT VIENNA	28 May 1973 22103 15 Oct 1973 B9018 22 Jan 1991		Hatch Transfer Death
70	F	14 Sep 1997	33	11	SD-WAP CINCINNAT	14 Sep 1997 897406 3 Jun 2004 204022 1 May 2008		Hatch Transfer Death
71	?	11 Jul 1979	69	162	VIENNA	11 Jul 1979 _____ 5 Oct 1979		Hatch Death
72	F	~ 1 Apr 1992	73	MULT	AL AIN NARC SWEIHAN NARC AL AIN	~ 1 Apr 1992 _____ 1 Jun 1993 470 29 Aug 1995 470 5 Nov 1996 470 15 Jun 2003 470 ~ 2004		Hatch Transfer Transfer Transfer Transfer Death
73	M	~ 1986	WILD	WILD	AFRICAN AL AIN NARC	~ Jan 1988 NONE ~ Jan 1988 _____ 1 Jun 1993 473 19 Jul 1998		Capture Transfer Transfer Death
74	F	~ 1986	WILD	WILD	AFRICAN AL AIN NARC	~ Jan 1988 NONE ~ Jan 1988 _____ 1 Jun 1993 657 12 Feb 1994		Capture Transfer Transfer Death
75	F	~ 1986	WILD	WILD	AFRICAN AL AIN NARC	~ Jan 1988 NONE ~ Jan 1988 _____ 1 Jun 1993 474 27 Mar 2001		Capture Transfer Transfer Death
76	F	~ 1986	WILD	WILD	AFRICAN AL AIN NARC	~ Jan 1988 NONE ~ Jan 1988 _____ 1 Jun 1993 471		Capture Transfer Transfer

						19 Feb 1994		Death
77	F	~ 1986	WILD	WILD	AFRICAN AL AIN NARC	~ Jan 1988 ~ Jan 1988 1 Jun 1993 12 Jun 1994	NONE <u>465</u>	Capture Transfer Transfer Death
78	F	~ 1 Jan 1990	73	MULT	AL AIN NARC	~ 1 Jan 1990 1 Jun 1993 8 Feb 1994	<u>472</u>	Hatch Transfer Death
79	?	1 Feb 1994	73	MULT	NARC	1 Feb 1994 8 Apr 1994	492	Hatch Death
80	M	5 May 1994	81	82	NARC	5 May 1994 15 Dec 1994	643	Hatch Death
81	M	~ 1 Jan 1992	73	MULT	AL AIN NARC AL AIN	~ 1 Jan 1992 1 Jun 1993 15 Jun 2003	<u>466</u> 466	Hatch Transfer Transfer
82	F	~ 1 Jan 1992	73	MULT	AL AIN NARC AL AIN	~ 1 Jan 1992 1 Jun 1993 15 Jun 2003 11 Jan 2009	<u>463</u> 463	Hatch Transfer Transfer Death
83	F	26 Apr 1993	73	MULT	AL AIN NARC	26 Apr 1993 1 Jun 1993 26 Jun 1993	<u>273</u>	Hatch Transfer Death
84	F	25 May 1993	73	MULT	AL AIN NARC	25 May 1993 1 Jun 1993 4 Jul 1993	<u>274</u>	Hatch Transfer Death
85	?	~ 1 Aug 1993	73	MULT	NARC	~ 1 Aug 1993 3 Oct 1993	275	Hatch Death
86	?	31 May 1993	73	MULT	AL AIN NARC	31 May 1993 1 Jun 1993 7 Oct 1993	<u>276</u>	Hatch Transfer Death
87	?	12 Aug 1993	73	MULT	NARC	12 Aug 1993	277	Hatch

						26 Aug 1993		Death
88	M	20 May 1993	73	MULT	AL AIN NARC	20 May 1993 1 Jun 1993 21 Aug 1993	_____	Hatch Transfer Death
							278	
89	M	28 Mar 1993	73	MULT	AL AIN NARC	28 Mar 1993 1 Jun 1993 10 Jul 1993	_____	Hatch Transfer Death
							279	
90	?	3 Jan 1994	73	MULT	NARC	3 Jan 1994 12 Jan 1994	365	Hatch Death
91	F	4 Jan 1994	73	MULT	NARC SWEIHAN NARC SWEIHAN	4 Jan 1994 29 Aug 1995 12 Mar 1996 2 Jun 2003	415 415 415 415	Hatch Transfer Transfer Transfer
92	M	~ 1 Jan 1990	73	MULT	AL AIN NARC	~ 1 Jan 1990 1 Jun 1993 15 Mar 1999	_____	Hatch Transfer Death
							452	
93	M	~ 1 Jan 1991	73	MULT	AL AIN NARC SWEIHAN NARC AL AIN	~ 1 Jan 1991 1 Jun 1993 29 Aug 1995 5 Nov 1996 15 Jun 2003	_____	Hatch Transfer Transfer Transfer Transfer
							453 453 453 453	
94	M	~ 1 Jan 1990	73	MULT	AL AIN NARC	~ 1 Jan 1990 1 Jun 1993 17 Jun 1997	_____	Hatch Transfer Death
							454	
95	F	~ 1 Jan 1990	73	MULT	AL AIN NARC	~ 1 Jan 1990 1 Jun 1993 3 Aug 1997	_____	Hatch Transfer Death
							455	
96	F	~ 1 Jan 1990	73	MULT	AL AIN NARC SWEIHAN NARC AL AIN	~ 1 Jan 1990 1 Jun 1993 29 Aug 1995 5 Nov 1996 15 Jun 2003 6 Jul 2007	_____	Hatch Transfer Transfer Transfer Transfer Death
							456 456 456 456	

97	F	~ 1 Apr 1992	73	MULT	AL AIN NARC	~ 1 Apr 1992 1 Jun 1993 23 Sep 1998	_____	457	Hatch Transfer Death
98	M	~ 1 Apr 1992	73	MULT	AL AIN NARC AL AIN	~ 1 Apr 1992 1 Jun 1993 15 Jun 2003 21 Jan 2009	_____	458 458	Hatch Transfer Transfer Death
99	F	~ 1 Jun 1992	73	MULT	AL AIN NARC	~ 1 Jun 1992 1 Jun 1993 29 Jul 1999	_____	459	Hatch Transfer Death
100	F	~ 1 Apr 1992	73	MULT	AL AIN NARC	~ 1 Apr 1992 1 Jun 1993 8 Jun 1995	_____	460	Hatch Transfer Death
101	F	~ 1 Apr 1992	73	MULT	AL AIN NARC AL AIN	~ 1 Apr 1992 1 Jun 1993 15 Jun 2003 7 Apr 2008	_____	461 461	Hatch Transfer Transfer Death
102	M	17 Feb 1993	73	MULT	AL AIN NARC SWEIHAN NARC	17 Feb 1993 1 Jun 1993 29 Aug 1995 12 Mar 1996 13 Jul 2000	_____	462 462 462	Hatch Transfer Transfer Transfer Death
103	M	~ 1 Jan 1992	73	MULT	AL AIN NARC SWEIHAN NARC AL AIN	~ 1 Jan 1992 1 Jun 1993 29 Aug 1995 5 Nov 1996 15 Jun 2003	_____	464 464 464 464	Hatch Transfer Transfer Transfer Transfer
104	F	~ 1 Apr 1992	73	MULT	AL AIN NARC	~ 1 Apr 1992 1 Jun 1993 17 Jul 1994	_____	467	Hatch Transfer Death
105	M	~ 1 Apr 1992	73	MULT	AL AIN NARC	~ 1 Apr 1992 1 Jun 1993 17 Aug 1998	_____	468	Hatch Transfer Death

106	M	~ 1 Jul 1992	73	MULT	AL AIN NARC AL AIN	~ 1 Jul 1992 1 Jun 1993 15 Jun 2003 ~ 2004	469 469	Hatch Transfer Transfer Death
107	?	15 Jun 1994	73	75	NARC	15 Jun 1994 15 Jun 1994	644	Hatch Death
108	M	4 May 1994	73	75	NARC RIYADH	4 May 1994 12 Jul 1997	649 970126	Hatch Transfer ltf
109	M	27 May 1994	81	82	NARC	27 May 1994 23 Mar 2000	650	Hatch Death
110	M	5 Jun 1994	93	96	NARC AL AIN	5 Jun 1994 15 Jun 2003	651 651	Hatch Transfer
111	F	7 Jun 1994	103	101	NARC	7 Jun 1994 3 Oct 1994	652	Hatch Death
112	?	3 Feb 1994	73	MULT	NARC	3 Feb 1994 8 Feb 1994	656	Hatch Death
113	F	14 Aug 1994	103	72	NARC	14 Aug 1994 7 Aug 1995	658	Hatch Death
114	M	16 Aug 1994	73	75	NARC	16 Aug 1994 7 Jan 2001	659	Hatch Death
115	?	21 May 1993	MULT	MULT	AL AIN NARC	21 May 1993 1 Jun 1993 12 Jun 1993	711	Hatch Transfer Death
116	?	21 Apr 1993	73	MULT	AL AIN NARC	21 Apr 1993 1 Jun 1993 26 Jun 1993	712	Hatch Transfer Death
117	?	26 Jul 1993	73	MULT	NARC	26 Jul 1993 26 Jul 1993	713	Hatch Death
118	?	9 Mar 1995	73	75	SWEIHAN	9 Mar 1995	727	Hatch

						26 Mar 1995		Death
119	?	18 Mar 1995	93	96	NARC	18 Mar 1995 30 Apr 1995	728	Hatch Death
120	M	30 Mar 1995	73	75	NARC	30 Mar 1995 8 Jul 1998	729	Hatch Death
121	?	1 Apr 1995	93	96	NARC	1 Apr 1995 30 Aug 1995	730	Hatch Death
122	?	11 Apr 1995	93	96	NARC	11 Apr 1995 12 Apr 1995	732	Hatch Death
123	M	25 Apr 1995	73	75	NARC AL AIN	25 Apr 1995 15 Jun 2003	735 735	Hatch Transfer
124	F	22 May 1995	93	96	NARC	22 May 1995 15 Jan 1997	743	Hatch Death
125	M	2 Jun 1995	103	72	NARC	2 Jun 1995 28 Aug 1995	748	Hatch Death
126	F	7 Jun 1995	73	75	NARC	7 Jun 1995 2 Jun 2002	750	Hatch Death
127	?	8 Jun 1995	93	96	NARC	8 Jun 1995 23 Jun 1995	751	Hatch Death
128	F	17 Jun 1995	103	72	NARC	17 Jun 1995 9 May 1997	754	Hatch Death
129	F	26 Jun 1995	73	75	NARC	26 Jun 1995 28 Jan 1997	757	Hatch Death
130	?	17 Jul 1995	93	96	NARC	17 Jul 1995 2 Nov 1995	775	Hatch Death
131	M	23 Jul 1995	73	75	NARC AL AIN	23 Jul 1995 15 Jun 2003 ~ 2004	776 776	Hatch Transfer Death



132	F	17 Aug 1995	73	75	NARC	17 Aug 1995 19 Apr 1996	783	Hatch Death
133	F	19 Aug 1995	103	72	NARC	19 Aug 1995 25 Feb 1996	784	Hatch Death
134	M	27 Aug 1995	93	96	NARC	27 Aug 1995 4 Oct 1996	785	Hatch Death
135	F	29 Aug 1995	93	96	NARC RIYADH	29 Aug 1995 12 Jul 1997 26 Nov 1997	786 970127	Hatch Transfer Death
136	?	21 Sep 1995	103	72	NARC	21 Sep 1995 30 Sep 1995	806	Hatch Death
137	?	18 Apr 1993	73	MULT	AL AIN NARC	18 Apr 1993 1 Jun 1993 ~ 1 Aug 1993	<u>      </u> 825	Hatch Transfer Death
138	?	18 Jun 1993	73	MULT	NARC	18 Jun 1993 31 Jul 1993	826	Hatch Death
139	?	19 Jun 1993	73	MULT	NARC	19 Jun 1993 31 Jul 1993	827	Hatch Death
140	?	26 Jun 1993	73	MULT	NARC	26 Jun 1993 ~ 1 Aug 1993	828	Hatch Death
141	?	15 Feb 1996	73	75	NARC	15 Feb 1996 16 Feb 1996	849	Hatch Death
142	?	2 Mar 1996	81	101	NARC	2 Mar 1996 2 Mar 1996	850	Hatch Death
143	M	18 Mar 1996	73	75	NARC AL AIN	18 Mar 1996 15 Jun 2003	854 854	Hatch Transfer
144	?	31 Mar 1996	81	101	NARC	31 Mar 1996 30 Apr 1996	868	Hatch Death
145	M	31 May 1996	106	97	NARC	31 May 1996	881	Hatch

					AL AIN	15 Jun 2003 ~ 2004	881	Transfer Death
146	?	19 May 1996	103	72	SWEIHAN	19 May 1996 24 May 1996	882	Hatch Death
147	M	25 Jun 1996	73	75	NARC AL AIN	25 Jun 1996 15 Jun 2003	886 886	Hatch Transfer
148	F	28 Jun 1996	81	101	NARC	28 Jun 1996 6 Apr 1998	887	Hatch Death
149	F	18 Jun 1996	93	96	SWEIHAN NARC	18 Jun 1996 5 Nov 1996 9 Sep 1999	888 888	Hatch Transfer Death
150	?	5 Jul 1996	73	75	NARC	5 Jul 1996 6 Jul 1996	889	Hatch Death
151	?	17 Jul 1996	81	101	NARC	17 Jul 1996 2 Aug 1996	891	Hatch Death
152	?	6 Aug 1996	73	75	NARC	6 Aug 1996 11 Aug 1996	893	Hatch Death
153	F	21 Sep 1996	73	75	NARC AL AIN	21 Sep 1996 15 Jun 2003	929 929	Hatch Transfer
154	M	~ 1965	WILD	WILD	TANZANIA MORGAN D. FRANKFURT EXOTICWIN	~ Dec 1965 ~ Dec 1965 5 Jan 1966 1 Aug 1967	NONE _____ 22091 _____	Capture Transfer Transfer ltf Transfer
155	M	~ 1965	WILD	WILD	TANZANIA MORGAN D. FRANKFURT	~ Dec 1965 ~ Dec 1965 5 Jan 1966 21 Sep 1975	NONE _____ 22092 _____	Capture Transfer Transfer Death
156	M	~ 1965	WILD	WILD	TANZANIA MORGAN D. FRANKFURT EXOTICWIN	~ Jan 1966 ~ Jan 1966 17 Aug 1966 2 Apr 1967	NONE _____ 22093 _____	Capture Transfer Transfer ltf Transfer

157	F	~ 1965	WILD	WILD	TANZANIA MORGAN D. FRANKFURT	~ 1966 ~ 1966 17 Aug 1966 13 Dec 1982	NONE _____	22094	Capture Transfer Transfer Death
158	M	16 Jun 1971	155	157	FRANKFURT	16 Jun 1971 9 Sep 1971	22095	Hatch Death	
159	?	27 Jun 1971	155	157	FRANKFURT EXOTICWIN	27 Jun 1971 24 Sep 1971	22096 _____	Hatch ltf Transfer	
160	?	9 Jul 1971	155	157	FRANKFURT EXOTICWIN	9 Jul 1971 24 Sep 1971	22097 _____	Hatch ltf Transfer	
161	?	20 Jul 1971	155	157	FRANKFURT EXOTICWIN	20 Jul 1971 18 Oct 1972 31 Dec 1981	22098 _____	Hatch Transfer Death	
162	F	14 Aug 1972	155	157	FRANKFURT VIENNA	14 Aug 1972 10 Oct 1973 4 Nov 1984	22099 B9017	Hatch Transfer Death	
163	?	21 Jun 1972	155	157	FRANKFURT EXOTICWIN	21 Jun 1972 19 Dec 1972 30 Dec 1980	22100 _____	Hatch Transfer Death	
164	M	1 May 1973	155	157	FRANKFURT WALSRODE	1 May 1973 23 Apr 1974	22101 _____	Hatch ltf Transfer	
165	F	16 May 1973	155	157	FRANKFURT WALSRODE	16 May 1973 23 Apr 1974	22102 _____	Hatch ltf Transfer	
166	M	13 Sep 1973	155	157	FRANKFURT	13 Sep 1973 12 Apr 1988	22104	Hatch Death	
167	M	17 Sep 1974	155	157	FRANKFURT	17 Sep 1974 9 Jul 1975	22105	Hatch Death	
168	F	27 Sep 1974	155	157	FRANKFURT DUISBURG	27 Sep 1974 6 Mar 1975	22106 _____	Hatch ltf Transfer	

169	M	11 Jul 1977	166	157	FRANKFURT HERMANN'S	11 Jul 1977 9 May 1979	27605 _____	Hatch ltf Transfer
170	?	3 Jun 1978	166	157	FRANKFURT HERMANN'S	3 Jun 1978 9 May 1979	27979 _____	Hatch ltf Transfer
171	?	15 Jul 1979	166	157	FRANKFURT HERMANN'S	15 Jul 1979 13 Nov 1979	28222 _____	Hatch ltf Transfer
172	?	6 Aug 1979	166	157	FRANKFURT HERMANN'S	6 Aug 1979 13 Nov 1979	28549 _____	Hatch ltf Transfer
173	?	27 Aug 1979	166	157	FRANKFURT	27 Aug 1979 23 Mar 1980	28550	Hatch Death
174	?	4 Oct 1979	166	157	FRANKFURT	4 Oct 1979 6 Jan 1980	28551	Hatch Death
175	F	18 Jun 1980	166	157	FRANKFURT BERLINZOO	18 Jun 1980 4 Feb 1981 22 Apr 1981	28670 810043	Hatch Transfer Death
176	M	28 Jun 1980	166	157	FRANKFURT BERLINZOO	28 Jun 1980 4 Feb 1981 12 Jan 1984	28671 810044	Hatch Transfer Death
177	?	3 Oct 1980	166	157	FRANKFURT	3 Oct 1980 3 Oct 1980	28758	Hatch Death
178	M	22 Dec 1980	166	157	FRANKFURT DUISBURG	22 Dec 1980 22 Jun 1981	28977 _____	Hatch ltf Transfer
179	?	8 May 1981	166	157	FRANKFURT DUISBURG	8 May 1981 14 Jul 1981	29295 _____	Hatch ltf Transfer
180	?	14 Oct 1981	166	157	FRANKFURT	14 Oct 1981 31 Oct 1981	29296	Hatch Death
181	F	4 Jul 1997	41	53	SAN ANTON	4 Jul 1997 25 Jan 1998	970708	Hatch Death
182	F	9 Mar 1997	93	96	NARC	9 Mar 1997	941	Hatch

						3 Jul 1998		Death
183	M	17 Mar 1997	93	96	NARC AL AIN	17 Mar 1997 15 Jun 2003 16 Sep 2006	943 943	Hatch Transfer Death
184	F	27 Mar 1997	93	96	NARC	27 Mar 1997 1 Sep 1998	945	Hatch Death
185	F	3 Apr 1997	106	97	NARC AL AIN	3 Apr 1997 15 Jun 2003 ~ 2004	973 973	Hatch Transfer Death
186	M	5 Apr 1997	93	96	NARC	5 Apr 1997 31 Jul 1999	974	Hatch Death
187	M	8 Apr 1997	120	126	NARC AL AIN	8 Apr 1997 15 Jun 2003 ~ 2004	975 975	Hatch Transfer Death
188	F	13 Apr 1997	120	82	NARC	13 Apr 1997 18 Sep 1998	977	Hatch Death
189	M	21 Apr 1997	MULT	126	NARC	21 Apr 1997 29 Nov 1997	979	Hatch Death
190	M	22 Apr 1997	73	99	NARC	22 Apr 1997 4 Aug 2002	980	Hatch Death
191	M	23 Apr 1997	93	96	NARC AL AIN	23 Apr 1997 15 Jun 2003 ~ 2004	981 981	Hatch Transfer Death
192	M	26 Apr 1997	120	82	NARC	26 Apr 1997 13 Feb 2001	982	Hatch Death
193	M	4 May 1997	93	96	NARC	4 May 1997 10 Jun 2000	983	Hatch Death
194	F	7 May 1997	73	99	NARC AL AIN	7 May 1997 15 Jun 2003 ~ 2004	984 984	Hatch Transfer Death

195	M	19 May 1997	73	99	NARC	19 May 1997 8 Jul 1999	985	Hatch Death
196	?	23 May 1997	93	96	NARC	23 May 1997 23 May 1997	986	Hatch Death
197	F	28 May 1997	81	101	NARC	28 May 1997 20 Sep 1998	987	Hatch Death
198	F	31 May 1997	93	96	NARC	31 May 1997 13 Jan 1998	988	Hatch Death
199	M	10 Jun 1997	93	96	NARC	10 Jun 1997	992	Hatch
200	M	28 Jun 1997	98	75	NARC	28 Jun 1997 20 Jun 1998	993	Hatch Death
201	F	10 Jul 1997	106	97	NARC	10 Jul 1997 3 May 2000	994	Hatch Death
202	F	10 Jul 1997	93	96	NARC	10 Jul 1997 21 Dec 1998	995	Hatch Death
203	F	13 Jul 1997	98	75	NARC	13 Jul 1997	996	Hatch
204	F	~ 1985	WILD	WILD	AFRICAN WALDON W	~ 1987 ~ 1987 ~ 1999	NONE _____ _____	Capture Transfer ltf Transfer
205	M	~ 1985	WILD	WILD	AFRICAN WALDON W	~ 1987 ~ 1987 ~ 1999	NONE _____ _____	Capture Transfer ltf Transfer
206	M	~ Jul 1997	1	9	WALDON W HANCOCK D	~ Jul 1997 ~ Jan 1998 ~ Jan 1998	_____ _____ _____	Hatch Transfer Death
207	M	24 Jul 1997	98	75	NARC	24 Jul 1997 27 Jul 2001	997	Hatch Death
208	F	11 Jun 1997	2	4	SANDIEGOZ	11 Jun 1997	497124	Hatch

						14 Feb 1998		Death
209	M	19 Jul 1997	41	53	SAN ANTON TOLEDO COLUMBUS	19 Jul 1997 970751 18 Nov 1998 981630 14 Apr 2006 106011		Hatch Transfer Transfer
210	F	2 Aug 1997	41	53	SAN ANTON	2 Aug 1997 970805 4 Jan 1998		Hatch Death
211	?	~ May 1998	1	9	WALDON W	~ May 1998 _____ ~ Aug 1998		Hatch Death
212	F	~ May 1998	205	204	WALDON W	~ May 1998 _____	ltf	Hatch
213	F	~ Jul 1998	205	204	WALDON W	~ Jul 1998 _____	ltf	Hatch
214	F	24 Jun 1998	6	7	DALLAS	24 Jun 1998 98C335 9 Jun 2004		Hatch Death
215	F	1 Jul 1998	6	7	DALLAS TOLEDO	1 Jul 1998 98C342 2 Nov 2000 1623 1 Apr 2005		Hatch Transfer Death
216	M	17 Jul 1998	41	53	SAN ANTON	17 Jul 1998 980761 25 May 1999		Hatch Death
217	F	27 Jul 1998	41	53	SAN ANTON CALDWELL	27 Jul 1998 980769 16 Oct 2001 104733 20 Sep 2002		Hatch Transfer Death
218	?	~ Jul 1998	1	9	WALDON W	~ Jul 1998 _____ ~ Aug 1998		Hatch Death
219	M	~ Jun 1998	49	67	WALDON W	~ Jun 1998 _____ ~ Aug 1998		Hatch Death
220	M	~ Jun 1998	49	67	WALDON W	~ Jun 1998 _____ ~ Aug 1998		Hatch Death
221	M	20 May 1998	93	96	NARC	20 May 1998 1214 7 Jan 2001		Hatch Death

222	M	12 Aug 1998	41	53	SAN ANTON	12 Aug 1998 27 Apr 1999	980825	Hatch Death
223	M	23 Aug 1998	41	53	SAN ANTON	23 Aug 1998 23 Jan 1999	980842	Hatch Death
224	M	29 Sep 1998	41	53	SAN ANTON	29 Sep 1998 22 Nov 1998	980923	Hatch Death
225	F	17 Jun 1994	2	4	SANDIEGOZ	17 Jun 1994 26 Sep 1994	494137	Hatch Death
226	?	~15 May 1998	UNK	UNK	NARC	~15 May 1998 18 Jun 1998	1216	Hatch Death
227	F	24 Jul 1999	33	11	SD-WAP	24 Jul 1999 28 Jul 1999	899240	Hatch Death
228	?	12 Aug 1999	41	53	SAN ANTON	12 Aug 1999 20 Dec 1999	990831	Hatch Death
229	F	24 Aug 1999	41	53	SAN ANTON COLUMBIA	24 Aug 1999 8 Mar 2000 22 Nov 2000	990874 6806	Hatch Transfer Death
230	M	22 Mar 1999	106	82	NARC AL AIN	22 Mar 1999 15 Jun 2003 ~ 2004	1348 1348	Hatch Transfer Death
231	F	5 Apr 1999	106	82	NARC	5 Apr 1999 21 May 2001	1360	Hatch Death
232	M	4 Jun 1999	98	126	NARC AL AIN	4 Jun 1999 15 Jun 2003	1361 1361	Hatch Transfer
233	?	8 Apr 1999	93	96	NARC	8 Apr 1999 26 Oct 1999	1364	Hatch Death
234	M	18 Apr 1999	106	82	NARC AL AIN	18 Apr 1999 15 Jun 2003 ~ 2004	1365 1365	Hatch Transfer Death



235	F	26 Apr 1999	187	72	NARC AL AIN	26 Apr 1999 15 Jun 2003	1366 1366	Hatch Transfer
236	F	30 Apr 1999	98	126	NARC	30 Apr 1999 5 Jan 2001	1368	Hatch Death
237	F	8 May 1999	106	82	NARC	8 May 1999 8 Jun 2000	1370	Hatch Death
238	F	9 May 1999	187	82	NARC AL AIN	9 May 1999 15 Jun 2003 17 Mar 2010	1371 1371	Hatch Transfer Death
239	F	10 May 1999	98	126	NARC AL AIN	10 May 1999 15 Jun 2003	1372 1372	Hatch Transfer
240	?	21 May 1999	98	126	NARC	21 May 1999 11 Aug 1999	1374	Hatch Death
241	?	23 May 1999	187	72	NARC	23 May 1999 13 Jun 1999	1375	Hatch Death
242	?	15 Jun 1999	93	96	NARC	15 Jun 1999 26 Sep 1999	1376	Hatch Death
243	?	17 Jun 1999	187	72	NARC	17 Jun 1999 21 Jul 1999	1377	Hatch Death
244	F	19 Jun 1999	98	126	NARC	19 Jun 1999 31 Jul 2000	1378	Hatch Death
245	F	4 Jul 1999	98	126	NARC AL AIN	4 Jul 1999 15 Jun 2003	1379 1379	Hatch Transfer
246	F	17 Jul 1999	98	126	NARC AL AIN	17 Jul 1999 15 Jun 2003	1381 1381	Hatch Transfer
247	?	22 Feb 2000	106	82	NARC	22 Feb 2000 22 Feb 2000	1918	Hatch Death
248	M	14 Mar 2000	187	72	NARC AL AIN	14 Mar 2000 15 Jun 2003	1806 1806	Hatch Transfer

						~ 2004		Death
249	?	18 Mar 2000	98	126	NARC	18 Mar 2000 22 Jun 2000	1807	Hatch Death
250	?	14 Apr 2000	187	72	NARC	14 Apr 2000 20 Aug 2000	1810	Hatch Death
251	?	20 Apr 2000	98	126	NARC	20 Apr 2000 13 Jul 2000	1813	Hatch Death
252	?	25 Apr 2000	187	72	NARC	25 Apr 2000 31 Jul 2000	1817	Hatch Death
253	M	5 May 2000	187	72	NARC AL AIN	5 May 2000 15 Jun 2003 ~ 2004	1826 1826	Hatch Transfer Death
254	?	5 Jun 2000	93	96	NARC	5 Jun 2000 5 Dec 2000	1827	Hatch Death
255	?	10 May 2000	192	75	NARC	10 May 2000 10 Dec 2001	1830	Hatch Death
256	?	13 May 2000	98	126	NARC	13 May 2000 8 Oct 2000	1834	Hatch Death
257	?	13 May 2000	106	82	NARC	13 May 2000 12 Aug 2000	1835	Hatch Death
258	?	2 Feb 2000	98	126	NARC	2 Feb 2000 20 Aug 2000	1822	Hatch Death
259	?	7 May 2000	187	72	NARC	7 May 2000 31 May 2000	1839	Hatch Death
260	?	16 May 2000	93	96	NARC	16 May 2000 20 May 2000	1837	Hatch Death
261	M	23 May 2000	98	126	NARC AL AIN	23 May 2000 15 Jun 2003 23 Jan 2009	1847 1847	Hatch Transfer Death

262	M	23 May 2000	192	75	NARC	23 May 2000 27 Mar 2002	1848	Hatch Death
263	F	26 May 2000	187	72	NARC	26 May 2000 31 Oct 2002	1850	Hatch Death
264	F	30 May 2000	106	82	NARC	30 May 2000 28 Sep 2002	1855	Hatch Death
265	?	5 Jun 2000	98	126	NARC	5 Jun 2000 14 Jun 2000	1861	Hatch Death
266	?	6 Jun 2000	187	72	NARC	6 Jun 2000 16 Jun 2000	1863	Hatch Death
267	?	13 Jun 2000	106	82	NARC	13 Jun 2000 17 Dec 2000	1872	Hatch Death
268	?	13 Jun 2000	93	96	NARC	13 Jun 2000 17 Jun 2000	1873	Hatch Death
269	?	15 Jun 2000	98	126	NARC	15 Jun 2000 8 Jan 2001	1880	Hatch Death
270	?	8 Jun 2000	187	72	NARC	8 Jun 2000 25 Nov 2000	1882	Hatch Death
271	F	9 Jul 2000	98	126	NARC AL AIN	9 Jul 2000 15 Jun 2003 ~ 2004	1895 1895	Hatch Transfer Death
272	M	15 Jul 2000	192	75	NARC	15 Jul 2000 1 Jul 2002	1896	Hatch Death
273	M	3 Aug 2000	192	75	NARC AL AIN	3 Aug 2000 15 Jun 2003 26 Jan 2009	1901 1901	Hatch Transfer Death
274	F	29 May 2000	6	7	DALLAS COLUMBIA	29 May 2000 4 May 2001 30 Dec 2001	00D317 6935	Hatch Transfer Death

275	?	2 Aug 2000	41	53	SAN ANTON	2 Aug 2000 20 Aug 2000	G00009	Hatch Death
276	M	29 Sep 2000	41	53	SAN ANTON CALDWELL	29 Sep 2000 16 Oct 2001 18 May 2002	S00081 104732	Hatch Transfer Death
277	M	19 Jun 2001	33	11	SD-WAP	19 Jun 2001	801265	Hatch
278	F	18 Jul 2001	33	11	SD-WAP	18 Jul 2001 16 May 2002	801320	Hatch Death
279	?	2 Sep 2001	41	53	SAN ANTON	2 Sep 2001 27 Nov 2001	S01002	Hatch Death
280	F	26 May 2001	6	7	DALLAS SD-WAP	26 May 2001 18 Oct 2001 4 Jan 2005	01D887 801403	Hatch Transfer Death
281	M	31 Jul 2000	98	126	NARC AL AIN	31 Jul 2000 15 Jun 2003 8 Mar 2007	1899 1899	Hatch Transfer Death
282	?	10 May 2000	UNK	UNK	NARC	10 May 2000 13 Jul 2000	1831	Hatch Death
283	?	3 Apr 2001	98	126	NARC SAFA WILD	3 Apr 2001 16 Apr 2001	2001 _____	Hatch lft Transfer
284	M	4 Apr 2001	187	72	NARC SAFA WILD	4 Apr 2001 16 Apr 2001	2002 659	Hatch lft Transfer
285	?	16 Apr 2001	187	72	NARC SAFA WILD	16 Apr 2001 16 Apr 2001	2013 _____	Hatch lft Transfer
286	F	15 Apr 2001	98	126	NARC SAFA WILD	15 Apr 2001 16 Apr 2001	2011 660	Hatch lft Transfer
287	?	7 May 2001	93	96	NARC SAFA WILD	7 May 2001 23 May 2001	2020 _____	Hatch lft Transfer

288	?	6 May 2001	106	82	NARC SAFA WILD	6 May 2001 23 May 2001	2021 _____	Hatch ltf Transfer
289	F	10 May 2001	187	72	NARC SAFA WILD	10 May 2001 23 May 2001 22 Mar 2004	2023 661	Hatch Transfer Death
290	?	7 May 2001	93	96	NARC SAFA WILD	7 May 2001 23 May 2001	2030 _____	Hatch ltf Transfer
291	?	20 May 2001	106	82	NARC SAFA WILD	20 May 2001 23 May 2001	2032 _____	Hatch ltf Transfer
292	?	21 May 2001	187	72	NARC SAFA WILD	21 May 2001 23 May 2001	2033 _____	Hatch ltf Transfer
293	?	7 May 2001	98	126	NARC SAFA WILD	7 May 2001 23 May 2001	2019 _____	Hatch ltf Transfer
294	F	31 May 2002	6	7	DALLAS ST LOUIS	31 May 2002 24 Oct 2002	02E374 101992	Hatch Transfer
295	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX DALLAS	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003 27 Feb 2007	NONE _____ B03009 03E638	Capture Transfer Transfer Transfer Death
296	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX DALLAS	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03019 03E639	Capture Transfer Transfer Transfer
297	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX SAN ANTON	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03006 M03017	Capture Transfer Transfer Transfer
298	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX SAN ANTON	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03015 M03018	Capture Transfer Transfer Transfer

299	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03010	Transfer
					HOUSTON	18 Mar 2003	20385	Transfer
						2 May 2004		Death
300	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03016	Transfer
					HOUSTON	18 Mar 2003	20386	Transfer
301	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03008	Transfer
					WILD WRLD	18 Mar 2003	7012	Transfer
					SAN ANTON	12 Jan 2010	J10026	Transfer
302	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03018	Transfer
					WILD WRLD	18 Mar 2003	7013	Transfer
					SAN ANTON	12 Jan 2010	J10027	Transfer
303	M	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03005	Transfer
					DENVER	2 Apr 2003	A02499	Transfer
					FRESNO	28 May 2008	280161	Transfer
304	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03013	Transfer
					DENVER	2 Apr 2003	A02500	Transfer
						27 Dec 2007		Death
305	F	~ 2002	WILD	WILD	TANZANIA	~ 2002	NONE	Capture
					KROESEN	30 Dec 2002	_____	Transfer
					NY BRONX	4 Feb 2003	B03014	Transfer
					DENVER	2 Apr 2003	A02501	Transfer
						26 Feb 2008		Death

306	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX STCATHERN	~ 2002 30 Dec 2002 4 Feb 2003 1 May 2003 18 May 2004	NONE _____ B03011 B03011	Capture Transfer Transfer Transfer Death
307	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX STCATHERN	~ 2002 30 Dec 2002 4 Feb 2003 1 May 2003 31 May 2004	NONE _____ B03020 B03020	Capture Transfer Transfer Transfer Death
308	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX STCATHERN SD-WAP	~ 2002 30 Dec 2002 4 Feb 2003 1 May 2003 16 Feb 2005 20 May 2005	NONE _____ B03021 B03021 805017	Capture Transfer Transfer Transfer Transfer Death
309	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX STCATHERN SD-WAP	~ 2002 30 Dec 2002 4 Feb 2003 1 May 2003 16 Feb 2005 14 Dec 2009	NONE _____ B03012 B03012 805018	Capture Transfer Transfer Transfer Transfer Death
310	M	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX BIRMINGHM	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003	NONE _____ B03007 B03002	Capture Transfer Transfer Transfer
311	F	~ 2002	WILD	WILD	TANZANIA KROESEN NY BRONX BIRMINGHM FRESNO	~ 2002 30 Dec 2002 4 Feb 2003 18 Mar 2003 26 Oct 2009	NONE _____ B03017 B03003 290207	Capture Transfer Transfer Transfer Transfer
312	M	14 Aug 2003	33	280	SD-WAP ST LOUIS	14 Aug 2003 23 Jun 2004	803196 103526	Hatch Transfer
313	M	26 Aug 2003	33	280	SD-WAP CINCINNAT	26 Aug 2003 3 Jun 2004	803215 204021	Hatch Transfer

314	F	30 Mar 2004	297	298	SAN ANTON	30 Mar 2004	M04041	Hatch
315	F	4 Jul 2004	297	298	SAN ANTON SD-WAP	4 Jul 2004 21 Apr 2005 28 Jun 2009	L04002 805065	Hatch Transfer Death
316	?	19 Jun 2004	296	214	DALLAS	19 Jun 2004 21 Jul 2004	04F158	Hatch Death
317	M	7 Apr 2004	33	280	SD-WAP SEA WORLD	7 Apr 2004 17 Aug 2005 23 Oct 2005	804038 BCB001	Hatch Transfer Death
318	M	19 Apr 2004	33	280	SD-WAP	19 Apr 2004 28 Aug 2004	804052	Hatch Death
319	F	15 Jun 2004	33	280	SD-WAP	15 Jun 2004	804176	Hatch
320	F	29 Jun 2004	33	280	SD-WAP SEA WORLD METROZOO	29 Jun 2004 17 Aug 2005 28 Aug 2008	804199 BCB002 B80265	Hatch Transfer Transfer
321	M	12 Jul 2004	33	280	SD-WAP FRESNO DENVER OAKLAND	12 Jul 2004 24 Feb 2005 28 May 2008 17 Nov 2009	804217 250007 A08139 2552	Hatch Transfer Transfer Transfer
322	M	24 Jul 2004	33	280	SD-WAP	24 Jul 2004 18 Jan 2005	804237	Hatch Death
323	M	18 Feb 2005	6	7	DALLAS SAN ANTON	18 Feb 2005 20 Apr 2006	05F486 A06041	Hatch Transfer
324	M	2 May 2005	297	298	SAN ANTON HOUSTON	2 May 2005 3 Nov 2005	Y05002 22130	Hatch Transfer
325	F	22 Jul 2005	6	7	DALLAS	22 Jul 2005	05F906	Hatch
326	?	30 Dec 2006	312	294	ST LOUIS	30 Dec 2006 19 Jan 2007	105617	Hatch Death



327	M	~ 2005	UNK	UNK	AL AIN	~ 2005 _____ 31 Dec 2008	Hatch Death
328	M	~ 2005	UNK	UNK	AL AIN	~ 2005 _____	Hatch
329	F	~ 2005	UNK	UNK	AL AIN	~ 2005 _____	Hatch
330	M	8 May 2007	321	47	FRESNO SEA WORLD	8 May 2007 270178 7 Feb 2008 BCB003 21 Jun 2008	Hatch Transfer Death
331	F	8 Apr 2007	324	300	HOUSTON	8 Apr 2007 22909 1 Nov 2007	Hatch Death
332	M	12 May 2007	324	300	HOUSTON RIO GRAND	12 May 2007 22959 24 Jun 2008 B08023	Hatch Transfer
333	F	1 Jun 2007	297	298	SAN ANTON	1 Jun 2007 U07001 26 Nov 2008	Hatch Death
334	M	12 Apr 2007	312	294	ST LOUIS METROZOO	12 Apr 2007 105711 12 Mar 2008 B80045	Hatch Transfer
335	M	5 May 2003	6	7	DALLAS	5 May 2003 03E691 3 Sep 2003	Hatch Death
336	F	19 Jul 2007	324	300	HOUSTON COLUMBIA	19 Jul 2007 23184 27 Feb 2008 9935	Hatch Transfer
339	F	30 Nov 2007	23	298	SAN ANTON RIO GRAND	30 Nov 2007 N07051 28 Aug 2008 B08032	Hatch Transfer
340	F	17 May 1991	UNK	UNK	SD-WAP	17 May 1991 391445 30 Oct 1994	Hatch Death
341	M	21 Apr 2008	297	298	SAN ANTON	21 Apr 2008 A08069	Hatch
342	M	3 Jun 2008	296	325	DALLAS	3 Jun 2008 08J116	Hatch
343	M	31 Jul 2008	296	325	DALLAS	31 Jul 2008 08J327	Hatch
344	F	21 Jul 2008	297	298	SAN ANTON	21 Jul 2008 L08063	Hatch

345	M	31 May 2008	324	300	HOUSTON PHILADELP	31 May 2008 22 Jan 2009	24167 205660	Hatch Transfer
346	?	20 Jul 2007	296	325	DALLAS	20 Jul 2007 30 Jul 2007	07H405	Hatch Death
347	?	29 Jun 2009	324	300	HOUSTON	29 Jun 2009	24966	Hatch
348	F	10 Jun 2009	324	300	HOUSTON	10 Jun 2009	24935	Hatch
349	M	29 Jun 2009	324	300	HOUSTON PHOENIX	29 Jun 2009 13 May 2010	24966 UNK	Hatch Transfer
350	F	~ 8 Jan 2009	23	298	SAN ANTON	~ 8 Jan 2009	L09037	Hatch
351	F	26 Aug 2009	323	314	SAN ANTON	26 Aug 2009	G09034	Hatch
352	F	23 May 2009	296	325	DALLAS	23 May 2009	09J877	Hatch
353	M	25 Sep 2009	296	325	DALLAS	25 Sep 2009	09K003	Hatch
354	M	30 Mar 2009	309	315	SD-WAP	30 Mar 2009	809036	Hatch
355	?	10 May 2009	123	246	AL AIN	10 May 2009	UNK	Hatch
356	?	2 Apr 2010	23	298	SAN ANTON	2 Apr 2010	A10004	Hatch

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TOTALS: 133.129.92 (354)



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## HISTORICAL HOLDING FACILITIES

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### AFRICAN AFRICAN REGION

#### AL AIN Al Ain Zoo

PO Box 1204, Al Ain, Abu Dhabi, United Arab Emirates

#### ALENTADO Exotics Unlimited (Antonio Alentado)

9564 SW 58th St., Miami, Florida, USA, 33149

#### BALTIMORE Maryland Zoo in Baltimore

1876 Mansion House Drive, Baltimore, Maryland, USA, 21217

#### BELLBIRD Bellbird

Laguna Hills, California, USA

#### BERLINZOO Zoologischer Garten Berlin AG

Hardenbergplatz 8, D-10787 Berlin, Germany

#### BIRMINGHAM Birmingham Zoo

2630 Cahaba Rd., Birmingham, Alabama, USA, 35223

#### CALDWELL Caldwell Zoo

PO Box 4785, Tyler, Texas, USA, 75712-4785

#### CINCINNAT Cincinnati Zoo & Botanical Garden

3400 Vine St., Cincinnati, Ohio, USA, 45220-1399

#### COLUMBIA Riverbanks Zoo and Garden

PO Box 1060, Columbia, South Carolina, USA, 29202-1060

#### COLUMBUS Columbus Zoo and Aquarium

PO Box 400, Powell, Ohio, USA, 43065-0400

#### CRACID BC Cracid Breeding & Conservation Ctr.

Heirbaan 27, 3620 Neerharen, Belgium

#### DALLAS Dallas Zoo

650 South R.L. Thornton Freeway, Dallas, Texas, USA, 75203-3013

#### DENVER Denver Zoological Gardens

City Park, Denver, Colorado, USA, 80205-4899

#### DUISBURG Zoo Duisburg AG

Milheimerstrasse 273, Duisburg, N Rhine-westph, Germany, D-47058

EXOTICWIN Exotic Wings & Pet Things(Mark Koenig)  
20 King St East, St Clements, Ontario, Canada, N0B 2M0

FRANKFURT Frankfurt Zoo  
Alfred-Brehm-Platz 16, Frankfurt Am Main, Germany, D-60316

FRESNO Chaffee Zoological Gardens of Fresno  
894 W Belmont Ave., Fresno, California, USA, 93728-2891

HANCOCK D Hancock Wildlife Research Center  
1431 Harrison Ave., Blaine, Washington, USA, 98231

HERMANN'S Vogelpark Hermanns (Fritz Hermanns)  
Vollmerswerther Str 297, Dusseldorf, N Rhine-westph, Germany, D-4000

HOUSTON Houston Zoo, Inc.  
1513 N MacGregor, Houston, Texas, USA, 77030-1603

KNOXVILLE Knoxville Zoological Gardens  
P.O. Box 6040, Knoxville, Tennessee, USA, 37914

KROESEN Zool.EnterprisesChicago-George Kroesen  
1031 W Lunt Ave, Schaumburg, Illinois, USA, 60193

METROZOO Miami Metrozoo  
One Zoo Boulevard, Miami, Florida, USA, 33177-1402

NARC National Avian Research Center  
Envir.Research&Wldlf Dev.Agency, Abu Dhabi, United Arab Emirates

NY BRONX Bronx Zoo/Wildlife Conservation Societ  
2300 Southern Blvd., Bronx, New York, USA, 10460-1099

PALM DES The Living Desert Zoo and Gardens  
47-900 Portola Ave., Palm Desert, California, USA, 92260

PHILADELPHIA The Philadelphia Zoo  
3400 W Girard Ave., Philadelphia, Pennsylvania, USA, 19104

PRETORIA National Zoological Gardens of  
South Africa, Pretoria 0001, Gauteng, South Africa

RIO GRAND Albuquerque Biological Park  
903 Tenth St. SW, Albuquerque, New Mexico, USA, 87102-4098

RIYADH Riyadh Zoological Gardens

P.O. Box 27055, Riyadh 11417, Saudi Arabia

SAFA WILD Wadi Al Safa Wildlife Centre  
PO Box 27875, Dubai, United Arab Emirates

SAIHATI Saihati Camel Farm & Desert Breed.Ctr.  
P.O. Box 1549, Yuma, Arizona, USA, 85366-1549

SAN ANTON San Antonio Zoological Gardens & Aqua  
3903 N. St. Mary's Street, San Antonio, Texas, USA, 78212-3199

SANDIEGOZ San Diego Zoo  
PO Box 120551, San Diego, California, USA, 92112-0551

SD-WAP San Diego Wild Animal Park  
15500 San Pasqual Valley Rd, Escondido, California, USA, 92027

SEA WORLD Sea World San Diego  
500 Sea World Dr., San Diego, California, USA, 92109-7904

ST LOUIS Saint Louis Zoological Park  
1 Government Dr., St. Louis, Missouri, USA, 63110-1395

STCATHERN St. Catherines Island / WCS  
182 Camellia Road, Midway, Georgia, USA, 31320-9801

TANZANIA TANZANIA  
East Africa, African Region

TOLEDO Toledo Zoological Gardens  
PO Box 140130, Toledo, Ohio, USA, 43614-0801

VIENNA Schoenbrunner Tiergarten GmbH  
Zoo Vienna, A-1130 Wien, Austria

WALDON W Waldon West BirdRanch-Nancy L Crawford  
25543 Waldon Road, Menifee, California, USA, 92584

WALSRODE Vogelpark Walsrode  
Am Rieselbach, D-29664 Walsrode, Germany

WILD Obtained From Wild

WILD WRLD Wildlife World Zoo  
Northern Ave. at State Route 303, Litchfield Park, Arizona, USA, 85340-9466

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## CURRENT HOLDING INSTITUTIONS

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<b>AL AIN</b>	<b>NARC</b>
AlAin Wildlife Park and Resort	National Avian Research Center
PO Box 1204	PO Box 45553
Al Ain, United Arab Emirates	Abu Dhabi, United Arab Emirates
Phone: +971 (03) 763 9991	Phone: +971 (3) 7347 555
Contact person: Dr. Azhar Abbas	Contact person: Dr. Tatiana Aponte
Email: Azhar.Abbas@awpr.ae	Email: tatiana.aponte@ead.ae
<b>BIRMINGHAM</b>	<b>CINCINNAT</b>
Birmingham Zoo	Cincinnati Zoo & Botanical Garden
2630 Cahaba Rd.	3400 Vine St.
Birmingham, AL USA 35223	Cincinnati, OH USA 45220-1399
Phone: (205)879-0409 x251	Phone: (513)475-6153
Contact person: Cindy Pinger	Contact person: David Oehler
Email: Cpinger@birninghamzoo.com	Email: David.Oehler@fuse.net
<b>COLUMBUS</b>	<b>COLUMBIA</b>
Columbus Zoo and Aquarium	Riverbanks Zoo & Garden
PO Box 400	500 Wildlife Parkway
Powell, OH USA 43065	Columbia SC USA 28202
Phone: 614 645 3400	Phone: 803 779 8717x 1159
Contact person: Kelly Vineyard	Contact person: Martin Vince
Email: Kelly.Vineyard@columbuszoo.org	Email: mvince@riverbanks.org
<b>DALLAS</b>	<b>FRESNO</b>
Dallas Zoo	Fresno Chaffee Zoo
650 South R.L. Thornton Freeway	894 W Belmont Ave.
Dallas, TX USA 75203-3013	Fresno, CA USA 93728-2891
Phone: (214)670-6839	Phone: (559)621-5700
Contact person: Chris Brown	Contact person: Andy Snider
Email: Chris.Brown@dallascityhall.com	Email: asnider@fresnochaffeezoo.com
<b>HOUSTON</b>	<b>OAKLAND</b>
Houston Zoo, Inc.	Oakland Zoo
1513 N MacGregor	PO Box 5238
Houston, TX USA 77030-1603	Oakland, CA USA 94605
Phone: (713)533-6525	Phone: 510 632 9525
Contact person: Hannah Bailey	Contact person: Julie Hartell-DeNardo
Email: Hbailey@houstonzoo.org	Email: julieh@oaklandzoo.org
<b>METROZOO</b>	<b>PHILADELP</b>

Miami Metrozoo	Philadelphia Zoo
12400 SW 152 <sup>nd</sup> St	3400 West Girard Ave
Miami FL USA 33177	Philadelphia PA USA 19104
Phone: (315) 251 0400x251	Phone 215 243 5368
Contact person: Jim Dunster	Contact person: Aliza Baltz
Email: JDUN@miamidade.gov	Email: Baltz.Aliza@phillyzoo.org
<b>RIO GRAND</b>	<b>SAN ANTON</b>
Albuquerque Biological Park	San Antonio Zoological Gardens & Aquarium
902 10 <sup>th</sup> St SW	3903 N. St. Mary's Street
Albuquerque NM USA 87102	San Antonio, TX USA 78212-3199
Phone: 505 764 6258	Phone: (210)734-7184
Contact person: Peter Shannon	Contact person: Josef San Miquel
Email: phoenicops@aol.com	Email: curbirds@sazoo-aq.org
<b>SD-WAP</b>	<b>ST LOUIS</b>
San Diego Wild Animal Park	Saint Louis Zoo
15500 San Pasqual Valley Rd	1 Government Dr.
Escondido, CA USA 92027	St. Louis, MO USA 63110-1395
Phone: (619)738-5077	Phone: (314)781-0900 x362
Contact person: Mike Mace	Contact person: Mike Macek
Email: mmace@sandiegozoo.org	Email: Macek@stlzoo.org
<b>WILD WRLD</b>	<b>PHOENIX</b>
Wildlife World Zoo	Phoenix Zoo
Northern Ave. at State Route 303	455 N. Galvin Parkway
Litchfield Park, AZ USA 85340-9466	Phoenix AZ 85008 JUSA
Phone: (623)935-9453	Phone 602 273 1341
Contact person: Jack Ewert	Contact person: John Sills
Email: jackewert@wildlifeworld.com	Email: Jsills@thephxzoo.com



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# BASIC BUSTARD HUSBANDRY

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## Introduction

This article presents key facts for aviculturalists who are working with bustards maintained in either breeding projects or zoological collections. Further information on how to manage bustards in captivity may be found in the references at the end of this article.

## Bustards

The bustard family is made up of 25 species in 11 genera. Four species, including the great Indian bustard (*Ardeotis nigriceps*), are listed by the IUCN (International Union for Conservation of Nature and Natural Resources) Red List of Threatened Animals as Endangered. One species is listed as vulnerable and an additional six are listed as near-threatened (del Hoyo et al. 1996). Bustards are medium sized to large terrestrial birds, chiefly inhabiting open plains in either arid or seasonally dry regions of the old world. Agricultural changes, overgrazing, hunting, trapping, habitat loss, droughts and wars are the main threats to bustards (del Hoyo et al. 1996). In recent years, there has been a surge of interest in the propagation of bustards in captivity, in particular, the houbara bustard (*Chlamydotis undulata*) in the Middle East and North Africa (Saint Jalme and Van Heezik, 1996). Similar programs for vulnerable and threatened species of bustards such as the great bustard (*Otis tarda*) have been established in Europe and the former Soviet Union as well as for the kori bustard (*Ardeotis kori*) in the United States. Programmes with threatened bustard species aim to produce surplus birds for release into protected areas, thereby supplementing declining wild populations, while houbara bustard projects in the Middle East and N. Africa aim to provide surplus birds for sustainable hunting using falcons (Bailey et al, 1996). Captive breeding programmes in the United States for kori bustards and buff-crested bustards (*Eupodotis ruficrista*) aim to maintain populations that are genetically and demographically self-sustaining and do not rely on continued imports from the wild (Hallager and Ballou, 2001).

## Husbandry

**Housing** - Differences exist in the housing of bustards both between and within species and according to the region in which the birds are maintained in captivity. In the Middle East, captive houbara are managed in an extreme climate outside of their natural breeding range, and they are maintained in environmentally controlled buildings. In North Africa, where captive houbara are bred within their natural breeding range, birds are maintained in outdoor aviaries. In the United States, kori bustards are maintained in outdoor pens, which are equipped with heated shed areas, where the birds are housed in during periods of inclement winter weather. Smaller species such as the buff-crested bustard and white-bellied bustard (*Eupodotis senegalensis*) are kept in both indoor and outdoor aviaries and provided with supplemental heat during the winter months if housed outdoors and/or

moved into winter holding facilities. The provision of shade and shelter are important for birds managed outdoors in tropical and temperate climates respectively, as is the use of predator-proof fencing material. All species of bustard are susceptible to frostbite and supplemental heat must be supplied when temperatures drop below 4°C. Outdoor aviaries may have alfalfa beds in addition to natural vegetation. This provides birds with cover to hide in and also encourages foraging for invertebrates attracted to the vegetation. Trauma is an important cause of morbidity and mortality of all captive bustards, so great attention is paid to using 'soft' materials when pens are constructed. Additionally, pinioning of chicks or feather cutting (primaries) of adults are important management tools to reduce the potential for self-inflicted injuries. Strict biosecurity of large captive breeding projects is an important issue. Smaller bustard species can be exhibited in mixed aviaries. Kori bustards should preferably be housed by themselves to facilitate breeding, but if necessary, can be maintained in mixed species exhibits with non-aggressive hoofstock.

**Diet and feeding** - Bustards are opportunistic omnivores and in the wild the diet reflects the local and seasonal abundance of plants and small animals, including invertebrates and small vertebrates. Studies of gut contents have shown that vegetation constitutes a significant proportion of the diet of some free-living bustards (del Hoyo et al. 1996). However, studies on the gut contents of kori bustards in Namibia have revealed mostly insects and very little plant material (T. Osborne, pers. communication). In captivity, bustards are fed mice, mealworms, crickets, apple, cabbage, chopped greens and either bustard pellets, game bird pellets, or a mixture of crane and ratite pellets (Sleigh and Samour, 1996). Beef mince can be used to replace mice or mealworms if either component is unavailable. Kori bustards in United States zoos are fed horsemeat in addition to mice and the meat is supplemented with either crane and ratite pellets or game bird pellets. The mixture is made into small meatballs and hand-tossed to each bird. This method of feeding facilitates close inspection of each bird as well as helps forming a trusting bond between the keeper and each bird. Pinkie mice are fed to smaller species of bustards, while fuzzie or adult mice are fed to the larger species such as kori bustards.

Calcium carbonate may be added to the fresh food mixture to compensate for the calcium imbalance that is caused by the addition of live food/mince. Multivitamin supplements (e.g. SA37; 1 g per 10 kg bodyweight) are provided to birds maintained in the Middle East (Sleigh and Samour, 1996). Maintenance pellets (15% protein) are fed to birds outside the breeding season and productioner pellets (20.5% protein) are fed during the breeding season (Anderson, 1998; Sleigh and Samour, 1996).

Food is presented in plastic or aluminium food dishes either once or twice a day. Water is provided ad-lib. Additional live food such as mealworms or crickets may be supplemented as part of taming protocols to reduce keeper-induced stress. To encourage natural foraging behavior, supplement the daily diet and provide a form of enrichment, chopped green beans, cherry tomatoes, hard-boiled egg, and blueberries are provided twice a week to kori bustards.

Medications may be given to specific birds within favoured items such as mice. Bustard chicks, like those of other long-legged species, are susceptible to long-bone disorders and chick-rearing diets must be supplemented with Vitamin D3 (e.g. Neutrobal, Vetark). Angel wing is a common occurrence in hand-reared kori bustard chicks,

typically occurring at day 11-14. Taping the affected primaries in a natural position at the first sign of the outward turning will permanently correct the deformity. A definitive cause of the problem has not been determined (Boylan et al. 2001).

**Capture** - Correct methods must be used to catch and handle bustards to avoid injuries. For birds maintained in outside aviaries in the Middle East, as well as North American zoos in the southwest, catches are carried out early in the morning to reduce the risk of heat stress. In the Middle East multivitamin solutions are given in the water before large catches to reduce the potential for capture-related myopathies. The specific methods for catching birds depend on the species, aviary size and the reason for the catch (translocation, medication, artificial insemination). Single small-medium sized birds in small outside aviaries are caught with catching nets. Single tame bustards in small indoor aviaries are caught by hand, after herding the bird into a corner. Flocks of birds in large aviaries can be captured using a catching corral. This is a blind-ended funnel with a wide mouth and a circular catching area at the blind end. Small and medium sized bustards can be caught using nets in the blind end, while larger species like kori bustards are caught by slowly guiding them into a small-darkened shed, cornering them and grabbing by hand. Nets should not be used with kori bustards.

**Handling** - Bustards should be held firmly against the handler's body, the wings should be fully closed and the legs held together, but prevented from rubbing against each other by positioning fingers between them. Legs can be held so that the legs are bent at the tibiotarsal joint. Some movement of the leg is allowed without letting the bird kick uncontrollably. Falcon hoods or cloth bags with holes for the nares can be used to calm birds down although hand-reared birds may be more comfortable without hoods. Birds should be kept as sternal as possible while being held as this reduces stress levels.

**Transportation** - Small bustards (up to 2 kg) can be transported in commercial pet carriers or cardboard boxes. Larger bustards, such as kori bustards can be transported individually in transport crates. Crate requirements for all bustard species can be found in the International Air Transport Association manual (IATA, 1998).

**Individual identification** - Bustards in captivity can be individually identified using coloured plastic rings with engraved coding attached above the tibiotarsal joint for visual identification of individuals in pens. Birds are also identifiable by means of a subcutaneous passive induced transponder (PIT), which is placed in the inner crural region of the leg.

**Routine health care** - Bustards in the Middle East have succumbed to variety of diseases, notably trichomoniasis, Newcastle disease and avian pox. Preventive medicine programmes include annual vaccination with inactivated Newcastle disease vaccine, live canary pox vaccine and regular (2-3 x year dependant on risk) anthelmintic and antiprotozoal medication given in the water or food. Vaccines are given during health-assessment catches held 1-2 months before the breeding season and during the cool season in the Middle East. Within the United States, internal parasites are occasionally



seen and avian pox has been reported in two chicks. Vaccines are not routinely administered in the United States. Kori bustards in zoo settings need to be carefully monitored for signs of impaction and zinc toxicity as they have a particular tendency to consume items thrown into their enclosures (e.g. pennies, camera batteries, nails, etc) by visitors. Daily inspection of pens and the removal of foreign material are very important.

### Breeding Management

**Sexing.** - Bustards show sexual dimorphism (Table 1). Some smaller species such as white-bellied bustards can be sexed by differences in head and throat plumage. Larger species, e.g. kori, are easily sexed at one year of age, for although the plumage of both sexes is similar, males are considerably larger. Juvenile bustards can also be sexed using endoscopy after about 6 months of age. Genetic sexing offers many advantages, being non-invasive and if done from feathers or blood collected from freshly hatched chicks, it can allow different sexes to be reared under different protocols.

**Table 1. Adult bodyweight of bustards.**

Species	♂ (kg)	♀ (kg)
Great bustard ( <i>Otis tarda</i> )	6-8.5	3.8-4.5
Kori bustard ( <i>Ardeotis kori struthinuculus</i> ) <sup>1</sup>	10-18	6-7
Kori bustard ( <i>Ardeotis kori kori</i> ) <sup>2</sup>	7-14	3-6
Houbara bustard ( <i>Chlamydotis undulata</i> )	1.5-2.5	0.8-1.4
White-bellied bustard ( <i>Eupodotis senegalensis</i> )	1.0-1.3	0.9-1.1
Buff-crested bustard ( <i>Eupodotis gindiana</i> )	0.4-0.8	0.4-0.6

<sup>1</sup> subspecies maintained in United States zoos

<sup>2</sup> subspecies maintained in the Middle East

**Breeding strategies** - Bustards are K-selected species - long-lived and a low reproductive output (del Hoyo et al. 1996). Management strategies for breeding vary according to the species but there are basically three regimes (Table 2). In most species, males and females do not establish a true pair-bond, and depend instead on a dispersed lek breeding system in which the males advertise themselves in traditional areas. Male bustards perform elaborate displays to attract females and maintain a dominance hierarchy. The females are left alone to undertake nesting, incubation, and rearing of the young. In captivity, houbara bustards managed as pairs or as mixed sex groups rarely, if ever, breed. Similarly, houbara bustards caught as adults remain sensitive to stress and in most cases fail to breed. Successful houbara bustard breeding projects use hand-reared birds, which are more suitable for intensive production efforts utilizing artificial insemination. White-bellied bustards are monogamous and adults are maintained in pairs. Kori bustards are managed in mixed-sex flocks, but can be managed as trios. Intra-specific aggression can occur between buff-crested pairs (♂-♀) and male koris (♂-♂) in the breeding season so care needs to be taken when there are changes to group

structure. Adult male kori's may require physical and visual separation during the breeding season to prevent aggression and physical injuries (Boylan et al. 2001).

**Table 2. Examples of breeding strategies.**

Strategy	Species	Age	Social Grouping
Isolated for artificial insemination	Houbara	Adult	Singles
		Juvenile	Small groups ( $\leq 5$ )
Pairs	White-bellied	Adult	Pairs
		Juvenile	Small groups ( $\leq 5$ )
Heterosexual groups	Kori	Adult	Large group ( $\sim 25$ )
		Adult	Trio or 2.3
		Juvenile	Large group ( $\sim 15$ )

### *End-piece*

Species such as houbara are in the early stages of 'domestication', as the objective is to produce large numbers of birds for managed hunting. Other species, e.g. great bustard and kori bustard, are maintained in captivity for conservation objectives. Productivity of all species in captivity is held back because of a poor understanding of nutritional requirements and high levels of breeder infertility and chick mortality. An expansion of the knowledge base for bustards is needed if advances in the husbandry and medical management of these birds are to be made.

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