

AL WABRA WILDLIFE PRESERVATION

Sheikh Saoud Bin Mohd. Bin Ali Al-Thani



Management and breeding of Pesquet's Parrots (*Psittrichas fulgidus*) at the Al Wabra Wildlife Preservation.

By
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Pesquet's Parrots in the wild

The Pesquet's Parrot (*Psittrichas fulgidus*), also known as the Vulturine Parrot or Borstenkopf, is a unique parrot native to the island of New Guinea. Its taxonomic status is unclear – it is the lone member of its genus; Collar (1997) even places the Pesquet's Parrot in its own tribe, Psittrichadini. It shows affinities with the sub-family Loriidae, but also possesses physical characteristics very similar to the genus Nestor – the Kea (*Nestor notabilis*) and the Kaka (*Nestor meridionalis*).

The plumage of the head and upperparts is black; the feathers of the head are particularly short and bristly. The throat and breast is scalloped dark grey. The belly, uppertail coverts and wing patches (median and greater wing coverts and outer secondaries) are red. The Pesquet's Parrot shows subtle sexual dimorphism – the male has a faint red patch of feathers behind the eye, which the female lacks. Another distinctive feature of the Pesquet's Parrot is its primary vocalization, which is almost impossible to describe – a harsh, repetitive, rasping, growl (with undertones of rusty gate-springs).

The alternative name of "Vulturine" Parrot is very apt - this species has a long, narrow, hooked bill and bare, dark facial skin behind the eye. As a young nestling, its thick white down is even reminiscent of a young raptor; this down subsequently changes to become even thicker and dark, around day 15. (The presence of this down is thought to be an adaptation to the colder temperatures at high altitudes, and perhaps even due to the long periods that parents spend away from the nest cavity in search of their typically low-protein food – see below.)

The Pesquet's Parrot is widely distributed throughout the mainland of New Guinea. It has an isolated population in the Tamrau Mountains of the Vogelkopf Peninsula in north-western Irian Jaya (Indonesia); its population then stretches from the Snow Mountains east of Geelvink Bay, through the Central Ranges, right down to the Huon Peninsula in the south-east of Papua New Guinea. See Figure 1.

Pesquet's Parrots are mostly found in tall, primary and secondary montane rainforest, between 600m to 1200m in altitude. However, they can range from as low as 50m, up to 2000m. Their distribution reflects their preference for habitat. In the wild, they live in groups up to 20 individuals, which forage noisily in the in the canopy.

Pesquet's Parrots feed mainly on the pulp of soft fruits, such as mango, figs and climbing *Pandanus*. They are messy eaters – the bare skin around the face is thought to be an adaptation to prevent the accumulation of pulp and juice on facial feathers. (The similar theory famously applies to the heads and necks of *Gyps* spp vultures, which bury their heads in the carcasses of carrion). Pesquet's Parrots have been observed eating flowers, so it is possible that nectar and pollen are a component of their diet. It is thought that the diet is significantly lower in protein and fat than the diet of typical seminivorous parrots.

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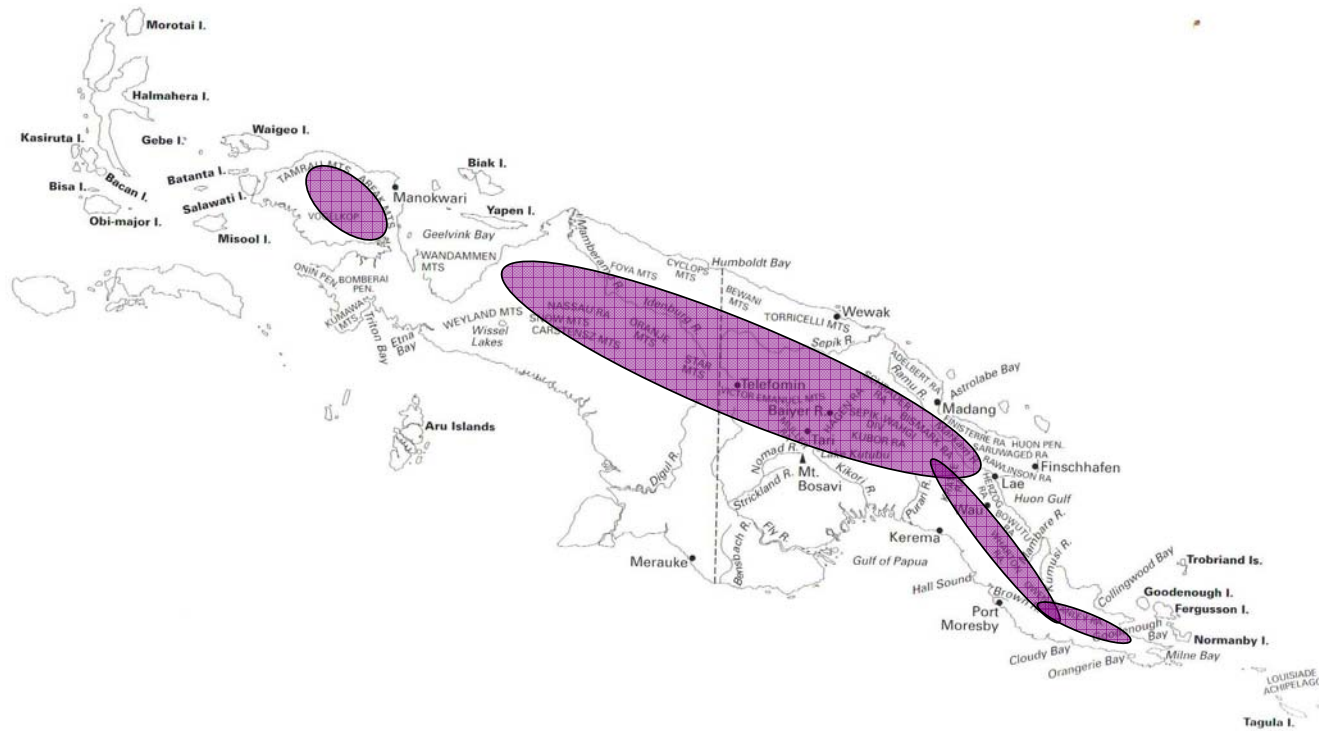
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Figure 1: Map of New Guinea showing distribution of Pesquet's Parrot. (Illustration of NG by William T. Cooper in Frith and Beehler 1998)



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Status of Pesquet's Parrots in captivity

Pesquet's Parrots are seldom kept in captivity and have reputation for being temperamental, hard to maintain and breed. Certainly the International Species Information System (ISIS) data reflects a scarcity of birds in registered zoos, and highlights minimal breeding success. (See Table 1) A significant number of unlisted birds are also kept by private or commercial aviculturists, but the limited number of birds on the commercial market reflects a lack of breeding success in private hands too.

Table 1: Status of Pesquet's Parrots in captivity: ISIS data (17th September 2008; AWWP data updated)

Institution	Males. Females. Unknowns	Hatches (last 12 months)
AL WABRA	4.4.2	2
ALBUSTAN	1.0.0	0
STUTT GART	1.0.0	0
PALMITOS	1.1.0	0
UMGENI PK	1.1.0	0
CINCINNAT	0.1.0	0
HOUSTON	0.1.0	0
LOSANGELE	1.1.0	0
SAN ANTON	1.1.0	0
SANDIEGOZ	0.2.0	0
SD-WAP	0.1.0	0
ST AUGUST	1.1.0	0
JAKARTA	1.1.0	0
JURONG	5.3.6	0
LAE	0.1.0	0
Total	17.19.8	2
Other facilities known to keep Pesquet's Parrots, not listed on ISIS: Loro Parque Walsrode Bird Park Amazona (William Horsfield)		

The first recorded breeding of the Pesquet's Parrot in captivity was achieved in the Netherlands in 1977. Other notable breeding successes have been achieved at Los Angeles Zoo (1980), San Diego Zoo (1984), Bronx Zoo (1986), Loro Parque (1986) and Jurong Bird Park (1992). Chicks have been both parent-reared and hand-reared successfully on a wide variety of diets.

Al Wabra Wildlife Preservation

The Al Wabra Wildlife Preservation (AWWP) is the private breeding centre of His Excellency Sheikh Saoud Bin Mohd. Bin Ali Al-Thani. AWWP is an associate member of the European Association of Zoos and Aquaria (EAZA); the facility is non-commercial and not open to the public.

The two major foci of the bird collection are Birds of Paradise and threatened parrots – 53 species of bird are currently maintained, including 6 species (7 taxa) of the family Paradisaeidae and 17 species of the order Psittaciformes. Table 2 shows an overview of the parrot collection at AWWP (16th September 2008).

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Table 2: Overview of the AWWP parrot collection (16th September 2008)

Species	Scientific Name	Number	Wild Status / Breeding Programme
Goffin's Cockatoo	<i>Cacatua goffini</i>	1.0.0 (1)	NT
Moluccan Cockatoo	<i>Cacatua moluccensis</i>	1.0.0 (1)	VU EEP
Red-tail Black Cockatoo	<i>Calyptorhynchus banksii samueli</i>	1.3.0 (4)	LC ESB
Yellow-tail Black Cockatoo	<i>Calyptorhynchus funereus funereus</i>	3.1.0 (4)	LC
Carnaby's Black Cockatoo	<i>Calyptorhynchus latirostris</i>	2.2.0 (4)	EN
Gang-gang	<i>Callocephalon fimbriatum</i>	1.1.0 (2)	LC
Eastern Rosella	<i>Platycercus eximius</i>	0.0.1 (1)	LC
Kea	<i>Nestor notabilis</i>	1.1.0 (2)	VU ESB
Pesquet's Parrot	<i>Psitttrichas fulgidus</i>	4.4.2 (10)	VU
Sun Conure	<i>Aratinga solstitialis</i>	2.2.0 (2)	EN
Golden Conure	<i>Guarouba guarouba</i>	1.4.0 (5)	EN EEP
Blue-headed Macaw	<i>Propyrrhura couloni</i>	6.4.2 (12)	EN
Blue-throated Macaw	<i>Ara glaucogularis</i>	4.7.4 (15)	CR EEP
Blue & Gold Macaw	<i>Ara ararauna</i>	1.0.0 (1)	LC
Hyacinth Macaw	<i>Anodorhynchus hyacinthinus</i>	4.3.2 (9)	EN EEP
Lear's Macaw	<i>Anodorhynchus leari</i>	3.9.0 (12)	CR ISB
Spix's Macaw	<i>Cyanopsitta spixii</i>	20.29.0 (49)	EW ISB
Total species		17	
Total birds		134	
EEP	EAZA European Endangered Species Programme		
ESB	EAZA European Studbook		
ISB	International Studbook		
LC	Least concern		
NT	Near-Threatened		
VU	Vulnerable		
EN	Endangered		
CR	Critical		
EW	Extinct in the Wild		

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At the start of the 2008 breeding season AWWP maintained 4.4 adult Pesquet's Parrots, of which there were two compatible pairs.

Aviary Management at AWWP

Pesquet's Parrots are known to be aggressive in captivity. Experiences at AWWP have shown that incompatible birds will savagely attack each other; in the past one bird has died due to cage-mate aggression. Therefore, each pair of birds is provided with two adjoining aviary units, facilitating separations and socializations, but allowing visual and auditory contact.

Pesquet's Parrots at AWWP are maintained in two different sizes of aviary units. Each unit comprises a larger outdoor aviary and a smaller indoor, climate controlled aviary. The dimensions of the Pesquet's aviary units are listed in Table 3.

Table 3: Dimensions of Pesquet's Parrot aviaries at AWWP.

Aviary type	Outdoor aviary			Indoor / climate controlled aviary		
	Length	Width	Height	Length	Width	Height
Larger	7.2m	3.6m	3.6m	3.0m	2.1m	2.7m
Smaller	5.4m	2.7m	3.6m	2.1m	2.1m	2.7m

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The outdoor aviary has several key features devoted to its major functions:

1. **Many perches at all heights** to provide multiple opportunities to find comfort and seclusion in the aviary.
2. **Large numbers of live plants** to mimic the rainforest canopy and provide seclusion. (Pesquet's Parrots scarcely chew on live plants.)
3. **Water sprinklers and shade-cloth on the roof** elevate humidity, reduce the temperature, providing a suitable environment for the birds and ensuring the plants survive.
4. **Two upright palm logs as nest cavities.** These palm logs should be at least 2.0m tall, 40-50cm in diameter and secured in an upright position. These palm logs should also be old and dry – our experiences have shown that freshly cut palm logs are too hard for the Pesquet's Parrots to excavate cavities.
5. **Pop-hole and sliding hatch door** to allow (and prevent) access between the indoor and outdoor aviaries.
6. **Hatches between aviaries** to allow socializations and separations of breeding pairs.

Similarly, the indoor aviary has several key features devoted to its major functions:

1. **Air conditioning.** Since Pesquet's Parrots are mostly found in montane rainforest, they are sensitive to the high temperatures experienced during the Qatar summer (up to 50° Celsius). Consequently, our birds spend significant amounts of the summer in their indoor, air-conditioned aviary. (They are quite capable of withstanding the cold nights of winter, with temperatures below 10° Celsius, without the need for heating.)
2. **Feeding station.** All the birds are provided with food and water in the indoor aviary. High temperatures quickly spoil food. Pesquet's Parrots are also messy eaters, which frequently scatter food.
3. **Small numbers of solid perches.** The smaller indoor aviary is most suited to capturing the birds for veterinary treatment, weight monitoring, and routine procedures (e.g. toe-nail trimming). Therefore there are limited perches in the indoor aviary, to facilitate the capture of birds.
4. **Concrete floor.** Pesquet's Parrots' fecal material and scattered food create large quantities of liquid, sticky debris (similar to a frugivorous passerine or turaco), which subsequently could support high levels of fungus and bacteria. A concrete floor allows for frequent cleaning with hoses and scrubbing brushes.

Nutrition

At AWWP we try to replicate the diet of wild Pesquet's Parrots – high in fruit, low in protein and fat. Certainly a seed-based diet is inappropriate for this species, in the same way that it would be inappropriate for a lorikeet. One of the key components of the AWWP diet is our "Pesquet Juice" – a blend of semi-liquidized fruit, which also contains artificial nectar. This thick paste is eaten very readily by the birds.

A number of vitamin and mineral supplements are added to the diet on a weekly basis – the use of a variety of products is a non-scientific attempt to cover all potential nutritional deficiencies. To date we have not experienced significant trends of mortalities caused by nutritional problems. (See Table 4).

At AWWP the birds are fed twice a day - we find it necessary to replace the morning food dish in the early afternoon to avoid issues of fruit spoiling with unwanted bacteria. We have found that morning food consumption is greater than the afternoon's, so we alter the food provision accordingly.

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Table 4: Diet for Pesquet's Parrots at AWWP

Amount of food per 1 Pesquet's Parrot		
	A.M.	P.M.
Banana	2 Tbl-sp	2 Tbl-sp
Papaya	2 Tbl-sp	2 Tbl-sp
Pear	2 Tbl-sp	
Apple		2 Tbl-sp
Mango		½ Tbl-sp
Seasonal fruit (e.g. Kiwi)		1 Tbl-sp
P15 parrot pellet	1 t-sp	
Witte Molen Beo softbill pellets		1 t-sp
Aleckwa honey-oat mix	½ Tbl-sp	
"Pesquet Juice"	6 Tbl-sp	
Nekton Lori		Sprinkle
Recipe for "Pesquet Juice" Fruit Smoothie: per bird.		
All fruit peeled & chopped, then blended until liquid.		
Nekton Lory	⅛ Tbl-sp	
Papaya	2 Tbl-sp	
Banana	1 Tbl-sp	
Pear	1 Tbl-sp	
Mango	1 Tbl-sp	
Orange	1 Tbl-sp	
Extras / supplements		
Saturday	Grape	2
	Nekton S	Sprinkle
Sunday	Fruit salad mix	1 Tbl-sp
Monday	Nekton Tonic F	Sprinkle
Tuesday	Orange	1 t-sp
Wednesday	Fruit salad mix	1 Tbl-sp
	Nekton MSA	Sprinkle
Thursday	Grape	2
Friday	Mixed vegetables	1 Tbl-sp
	Korvimin	Sprinkle

Veterinary considerations

There are no significant pathogenic trends which have led to mortality in our captive Pesquet's Parrots. Table 5 summarises the causes of mortality in 5 birds which have died at AWWP.

Sporadic gut infections, caused by bacteria (e.g. *Klebsiella* & *Enterobacter*) or fungi (e.g. *Candida*), may impact certain individuals throughout the year. Clinical symptoms include lethargy, lack of appetite and diarrhoeic fecals. The typical treatment is an oral course of Enrofloxacin (Baytril) and Nystatin, in combination with a *Lactobacillus* powder sprinkled on food to redress the bacterial imbalance.

Undiagnosed respiratory conditions also occasionally impact our birds, indicated by coughing and sneezing. It is suspected that this issue may be associated with breeding behaviour, when birds first start to excavate the nest cavities - the dust from the dry palm log irritating the respiratory airways. The typical course of action to this condition is to isolate the bird in its indoor aviary, away from the nest log, where we can monitor its symptoms, behaviour and food consumption. Usually, the condition clears within a week without the need for veterinary treatment.

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One adult male bird has a split lower mandible, which in turn fails to abrade the maxilla. Consequently the maxilla of this male requires re-sculpting with a Dremmel tool approximately every 6 months. Other routine work on all birds includes trimming of toe-nails, which grow long and curved despite a wide variety of bark-covered perches in their aviaries.

Table 5: Causes of mortality of Pesquet's Parrots at AWWP

Stocklist #	Sex	Age	Year of mortality	Cause of mortality (& other histopathological findings)
219	0.1	Adult	2004	Multiple trauma injuries from aggression by male cage-mate. (Also sub-clinical Hyperparathyroidism indicative of Ca deficiency.)
235	0.1	Adult	2000	Iron storage disease suspected - Haemosiderosis of Kupffer cells and hepatocytes.
304	0.1	Adult	2004	Nephritis / kidney failure, due to suspected intoxication.
5899	1.0	37 days	2006	Heavy fatty liver, fatty liver degeneration and necrosis; tubulonephrosis.
6154	0.1	55 days	2006	Oxygen deficiency due to anaemia, caused by a failure of erythropoiesis.

Breeding management

Compatible pairs may be left together all year around. Close proximity is a good indication of compatibility since it is rare to observe Pesquet's Parrots engaging in allopreening or allofeeding behaviour. When establishing new pairs, socialisations must be undertaken gradually, with monitoring and a great deal of caution. Pesquet's Parrots have the capability to kill their cage-mate in a very short period of time, coupled with a seemingly unpredictable temperament. In 2004, an adult female was killed by her male cage-mate, with whom she had been paired for 3 years. There had been no indications of aggression 2 hours earlier, but in that brief period of time she was fatally injured by the male, with injuries to the head, feet and neck.

The breeding season in Qatar usually begins in April when the pairs start to excavate their nest cavities. This is indicated by pairs becoming particularly active inside and directly around their chosen nest log. Another indication is the piles of palm pith shavings which accumulate in a particular location in the aviary – surprisingly this location is not on the ground directly around the opening of the cavity, but may be several metres from the nest log. It appears that the birds deliberately collect shavings within their feathers and drop them away from the nest by shaking their plumage (Dean Tugade, pers. comm.). Birds at AWWP have dug cavities up to 1.2 metres deep within palm logs. During the breeding season both birds become very defensive of the nest cavity, with the male being particularly pugnacious.

It is usual for 2 eggs to be laid in a clutch, approximately 3 days apart. Only the female incubates, although the male's responsibilities definitely include protecting the cavity. The incubation period is approx 28-31 days. We have found it difficult to get precise incubation data because of limited access to the nest – due to the nature of the nest log, depth of the cavity, the determination of the female to stay in the cavity and the aggression of the male. We make estimates of lay dates on the basis of the female's behaviour, but we have also found that her persistence in the cavity may be misleading.

During the period that we suspect the female is laying eggs, we aim to routinely check cavities every 3 days; however, this is flexible and often dictated by the willingness of the female to leave the nest. Eggs are pulled for artificial incubation soon after lay, since the nesting logs are located

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in the outdoor aviaries and it is feared that the eggs would overheat in the desert summer heat. Artificial incubation temperature is 37.5°C, with variable humidity according to the rate of the weight loss from the individual developing egg. During the 2008 season we pulled a total of 6 fertile eggs pulled from the two pairs. Unfortunately only 2 chicks hatched.

Hand-rearing

In the past, AWWP has experienced difficulties with the hand-rearing of Pesquet's Parrot chicks. Only one of the first three chicks that hatched survived to fledging – this chick was successfully raised during the winter of 2004-05, representing AWWP's first successful breeding of the species. The two other chicks hatched during winter 2005 and spring 2006. Despite promising early weight gains, these failed to thrive. (#5899 and #6154 in mortality data - Table 5).

Since wild Pesquet's Parrots are primarily frugivorous, it is concluded that the chicks have a low protein intake in the nest. Based on a recipe suggested by Loro Parque (and successfully used by them in 2006), we designed a feeding regimen which features a high fruit component (mostly papaya) and only a 50% concentration of generic parrot hand-rearing formula (NutriBird A21). Based on this diet, both chicks have thrived. At the time of writing, one chick is successfully weaned and the other anticipated to wean shortly.

Table 6 compares the ingredients, protein and fat content of the hand-rearing diets given to the two chicks in the unsuccessful 2005-2006 season, versus the two chicks in the successful 2008 season. The value for NutriBird A21 formula is the maximum value given to each chick during its development – in every case, during the early stages of development the concentration of solids in the hand-rearing diet was lower, in order to improve the hydration of the chick and make the diet more digestible.

Table 6: Comparisons of hand-rearing diet – 2005-2008 versus 2008.

Dietary ingredient	Content (grams) per 100g of diet		
	Chick #5899 2005-2006	Chick #6154 2006	Chicks #7858 & #7947 2008
NutriBird A21 hand-rearing formula	30g*	25g*	15g*
Fresh papaya	20g	20g	40g
Fresh banana	7g	7g	0g
Gerber baby food e.g. apple sauce	7g	7g	10g
Water	35g	30g	35g
Total Protein†	6.4	5.3	3.2
Total Fatt†	2.4	2.0	1.2

* Maximum value of NutriBird A21 given.

† Maximum value for protein and fat content, on the basis of the NutriBird A21 contribution.

In 2008, due to the low protein content of the diet, we experienced slow weight gain rates during development of the chicks. However, we have found that the chicks still eventually reach their target weight of approximately 600-650g. Another characteristic of the chicks' weight gain is the non-existence of a distinct pre-fledging peak in weight, which is typical of many other species during both parent- and hand-rearing. Figure 2 compares the mean weight gain of 3 surviving Pesquet's Parrots versus the mean weight gain of 4 healthy hand-reared Blue-throated Macaws (*Ara glaucogularis*). (Blue-throated Macaws are used as a comparison here since they also reach an eventual weight of approximately 650g, but are a "typical" parrot species.)

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Figure 2

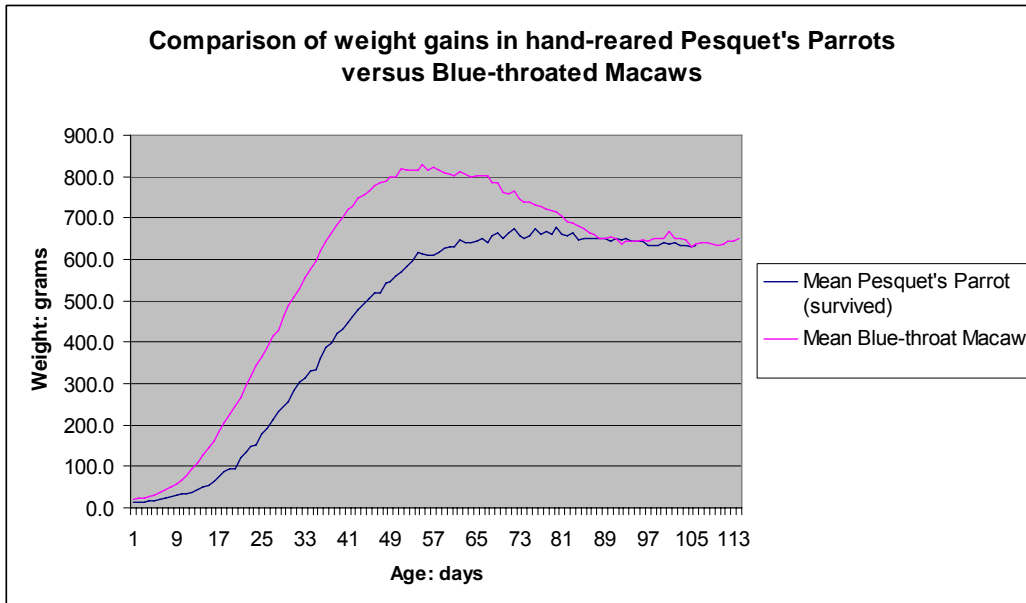
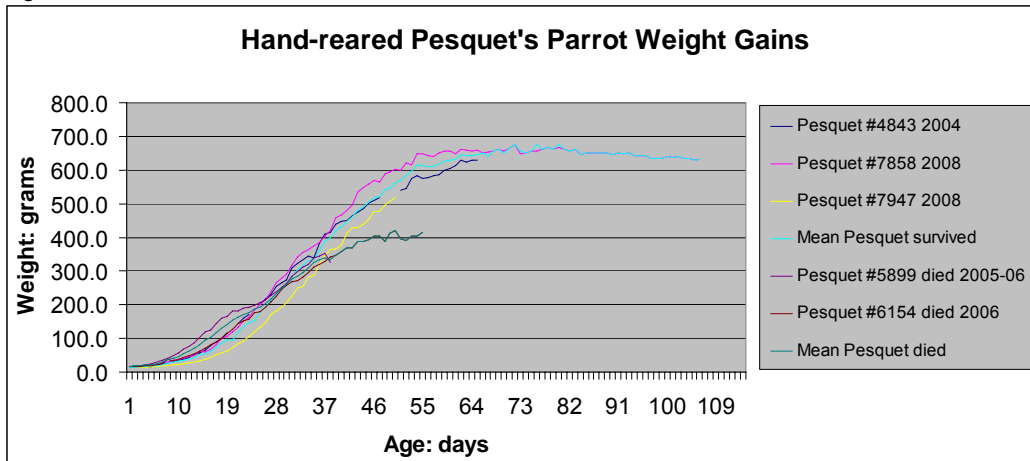


Figure 3 compares the weight gain progress of the two groups of Pesquet's Parrot chicks on different diets. When we compare the differences between the two chicks raised in 2008 on the low protein diet which subsequently survived, versus the 2 chicks raised in 2005-2006 on the higher protein diet which subsequently died, we can observe one key trend. The chicks fed on higher protein diet had a mean weight gain over the first 15 days which was higher than the chicks fed on a lower protein diet. From approximately day 20 onwards the chicks on the high protein diet were gaining weight at a slower rate, so that by day 30 the chicks' mean weights were approximately equal. From day 30 onwards the chicks on the high protein diet continued to gain weight at a slower rate, before they eventually succumbed.

Chick #7947 in 2008 was given a particularly low-protein diet during the first 15 days of life (approximately half the protein content of the diet given to chick #7858). This accounts for the slow rate of growth during the first 15 days. However, the diet was rectified after day 15 and the chick progressed to a fledging weight of over 600g without any signs of ill-health or stunted development.

Figure 3



Conclusions

Our experiences at AWWP have shown us that it is possible to maintain, breed and hand-rear Pesquet's Parrots, even far away from their montane rainforest habitat. However, management of Pesquet's Parrots presents particular challenges on the basis of devising the appropriate diet for adult birds and hand-reared chicks, management of nest sites and unusual behaviours such as aggression.

With regard to hand-rearing diet, it is obviously impossible to draw sound scientific conclusions on the basis of such small sample sizes. However, initial evidence certainly suggests that the high protein / high fat diet was detrimental to the development of Pesquet's Parrot chicks and may have contributed to the histopathological findings of liver damage in chick #5899. We hope to achieve further breeding success in the future, to provide further evidence for study of the growth and development of these fascinating parrots.

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