



Maximum Lorikeets -

- Minimum Overtime

Propagating lorikeets for interactive aviaries

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Lorikeets at Riverbanks

- Interactive Aviary opened in 2002
 - 41 lorikeets from 2 private breeders and Point Defiance Zoo
 - First hatch occurred in 2004
 - Lorikeets are bred on exhibit, parent raised, and hand-finished







Lorikeets at Riverbanks

- 2016
 - **86,861** nectar cups sold
 - 1,344,219 zoo visitors
 - **\$173,721.42 total revenue** (\$0.13 per zoo visitor)
 - **Annual overhead**
 - Guest Services staffing ~\$50,000
 - Nectar cost ~\$9000
 - **Net Revenue >\$100,000**



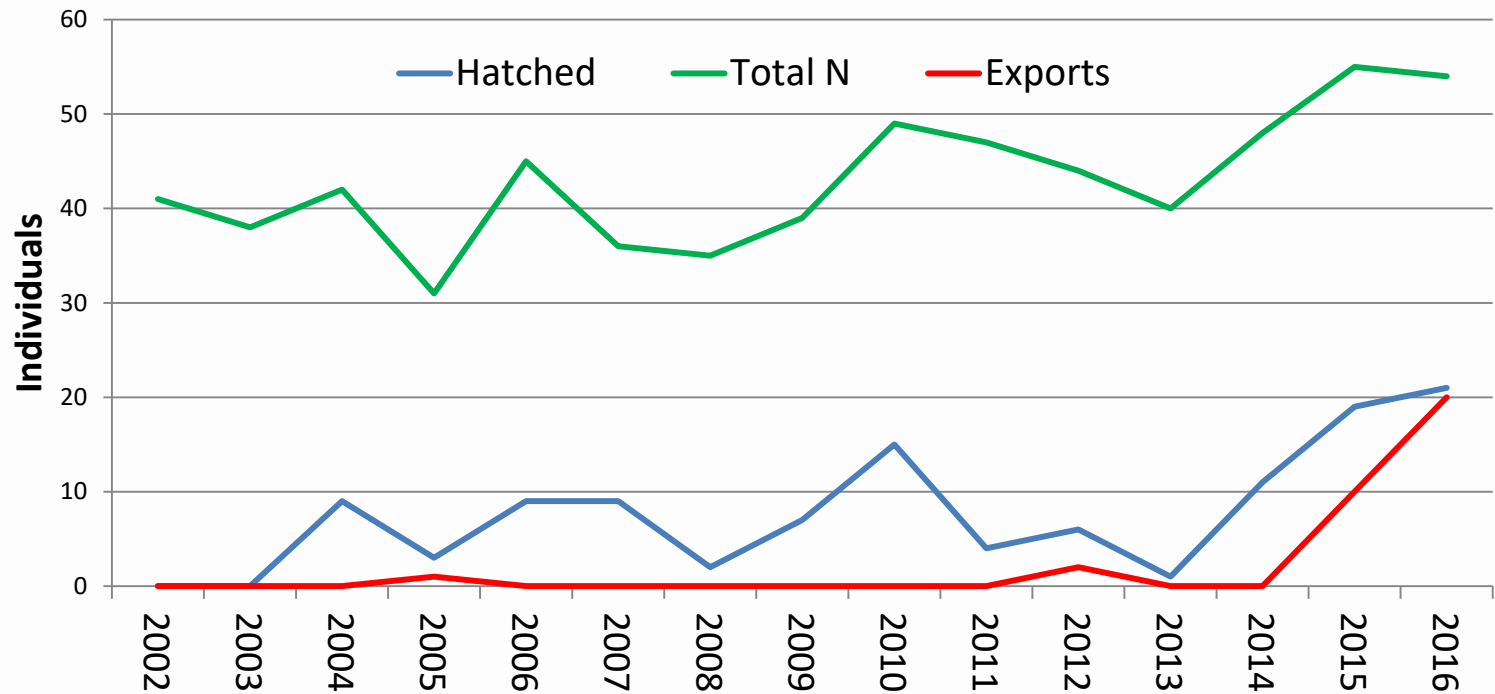
The birds (N=55)

Species comparison

	Coconut Lorikeet (<i>Trichoglossus haematodus</i>)  Remove	Rainbow Lorikeet (<i>Trichoglossus moluccanus</i>)  Remove
Figure		
Family	Parrots (<i>Psittacidae</i>)	Parrots (<i>Psittacidae</i>)
French, German and Spanish names	Loriquet à tête bleue Allfarblori Lori de cocotero	Loriquet arc-en-ciel Regenbogenlori Lori arcoiris
Other common names	Rainbow Lorikeet (when lumped with all other forms hitherto included in this species), Green-naped Lorikeet (<i>haematodus</i>), Massena's Lorikeet (<i>massena</i>)	Blue Mountain Lorikeet (<i>moluccanus</i>)

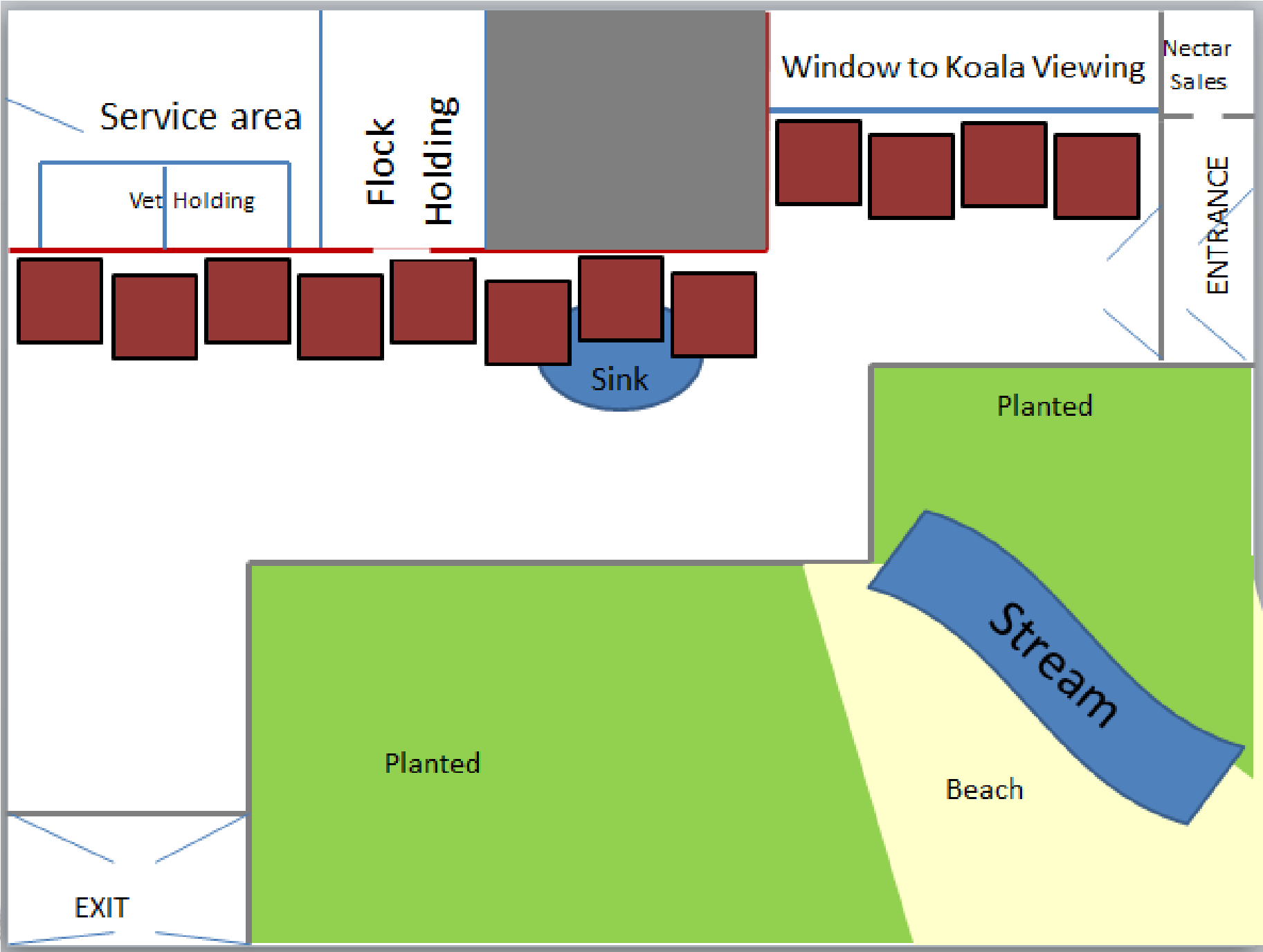


The birds (N=55)



The exhibit





The exhibit



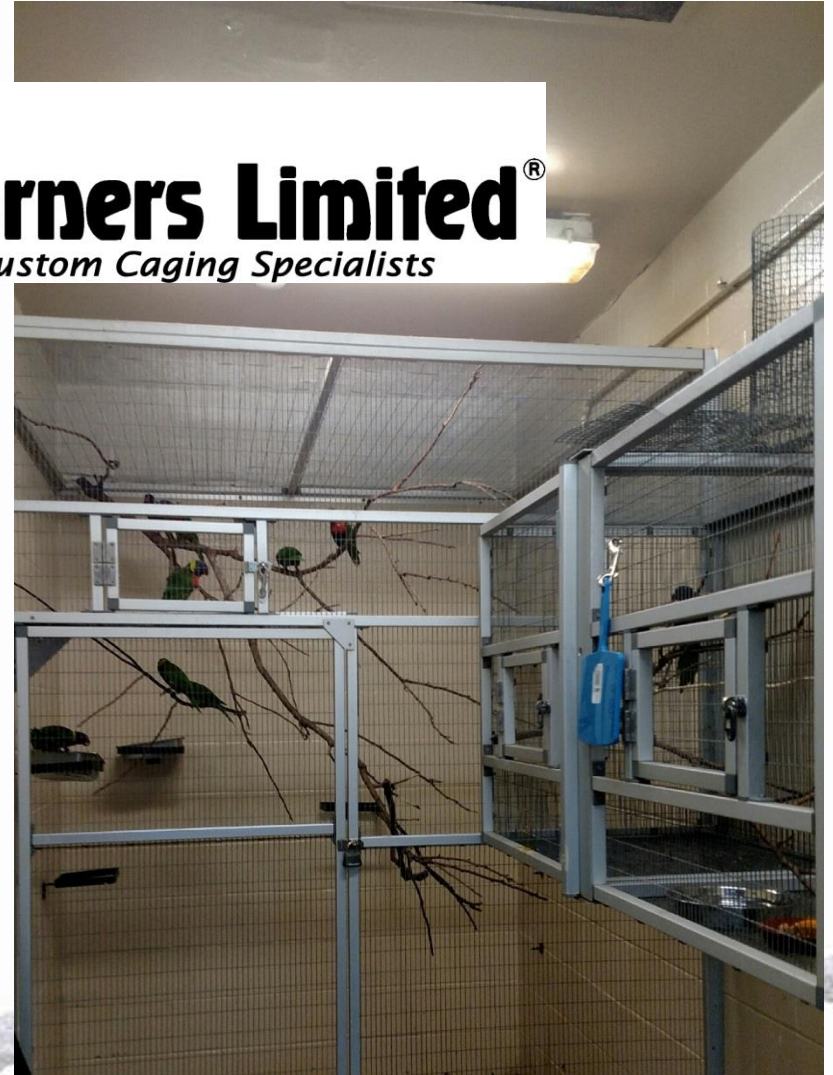
The exhibit



The exhibit



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Nest Boxes



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Nest Boxes

- 1:1:1 cavity mix
- Top soil : sphagnum moss : pine shavings



Nest Boxes

- Nests are checked weekly
 - Accurate hatch estimates/chick ages
 - Occasionally resulting in early pulls



Why pull?

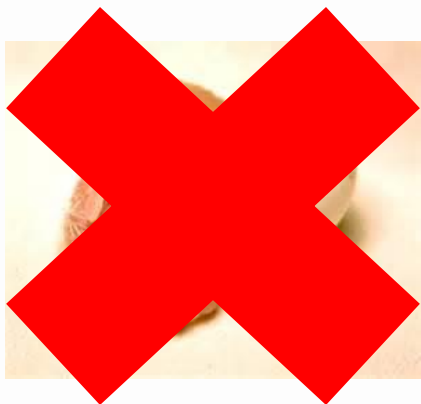
- On one hand, hard to justify significant resources for hand-rearing “common” species
- On the other hand, lorries generate revenue
- For RBZ, lorikeets are a
 - “producer” species
 - Hand-rearing “starter species”
- Aggressive flock behavior towards fledglings
- Problem children (e.g., plucked)



When to pull?



When to pull?



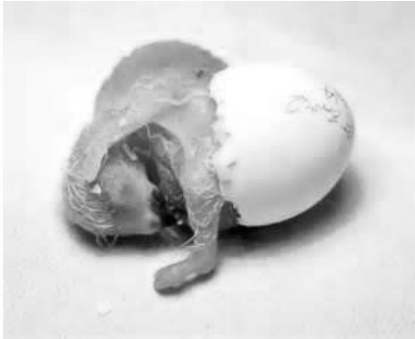
When to pull?



When to pull?



When to pull?



28-30 days old

Blue forehead but not crown

>>>cooperative feeders

Only 4 feeds per day 0800-1700!!!



When to pull?



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When to pull?



28-30 days old

Blue forehead but not crown

>>>cooperative feeders

Only 4 feeds per day 0800-1700!!!

33 days old

Only 3 feeds per day 0830-1630

>>>>>only 1 week of late feeds!!!



Housing



Housing



Housing



Housing



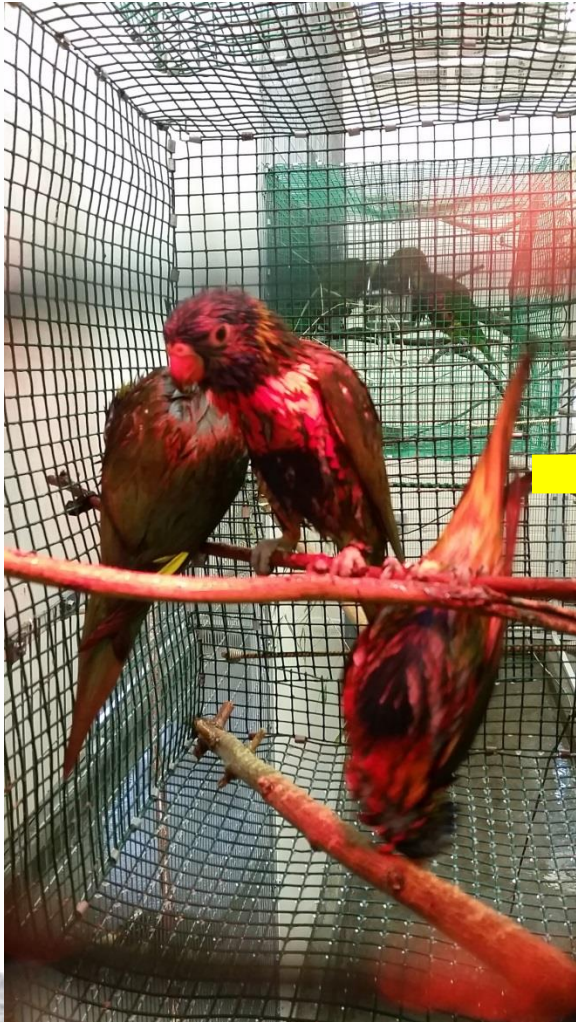
DAY	TEMP(°F)	BROODER
28	85° F	AICU Nest cup w/ nomad mat
32		Remove nest cup
35	83° F	Move to Box Brooder
40	81° F	Add a perch
50	76° F	
55	Ambient	Move to howdy with heat
58		no heat during day
62		no heat at night
65		Open howdy



Housing



Housing



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Back to the Flock



- Chicks (> day 70) go to small cage (1) for 48 hours
 - Flock members will enter the large holding cage (2) to investigate new birds
 - A few of the visitors will be locked in large holding
- Chicks are moved in with the visitors for 48 hours
- The new “group” is released onto exhibit



Feeding

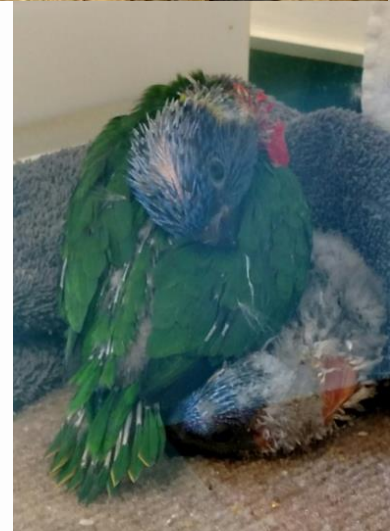


LoFe Fruit mix

75%	Frugivore
15%	Mazuri softbill (low iron)
10%	Mazuri small bird breeder

Frugivore

%	
10	grapes
10	banana
14	blueberry
14	papaya
50	apple
2	romaine
100	total



Feeding

- Frugivore - typically overnight only
 - Winter 65 g/bird (possible daytime allocation)
 - Summer 45 g/bird
- Nectar – ad lib all day
 - Birds get “full”



Feeding

DAY	FREQ.	DIET (By weight)	INTAKE	MISC.
28	0800, 1100, 1400, 1700 (4x)	20% Kaytee 80% bottled water	60-90%	Pull parent reared chicks by 30 days. Pulled chicks may benefit from 1 extra feeding first 1-2 days.
30		offer nectar w/ marbles to parent reared chicks (remove in PM)	55-70%	encourage self-feeding of nectar
32		22% Kaytee 78% bottled water		
33	0830, 1230, 1630 (3x)			
34		offer LoFeMix to parent reared chicks (remove in PM)		encourage self feeding of solids
35		Discontinue marbles in nectar if chicks consume regularly. Leave fresh lory frugivorous over night.		
38		25% Kaytee 75% bottled water	50-65%	encourage self feeding of formula
40	0900, 1500 (2x)			Go to 2x/day only if wt >100g
42			45-60%	
44		fresh food and nectar can remain overnight away from heat		bird should be weaning, encourage formula self feeding from cup
48	0900 (1x)			
52			40-60%	Self-feeding day 52-64, reduce formula offered daily, cup only - no syringe
60	discontinue formula			



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Feeding

- Last feed 1700
 - Food prep at 1650
 - Feed 1700 – 1715
 - Records 1715 – 1720
 - Clean-up 1720 -1730
 - 1730 Go Home!



Feeding

- Last feed 1700
 - Food prep at 1650
 - Feed 1700 – 1715
 - Records 1715 – 1720
 - Clean-up 1720 -1730
 - 1730 Go Home! Only for the first week!





Feeding

By weight

DAY	FREQ.	DIET (By weight)	INTAKE	MISC.
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Feeding

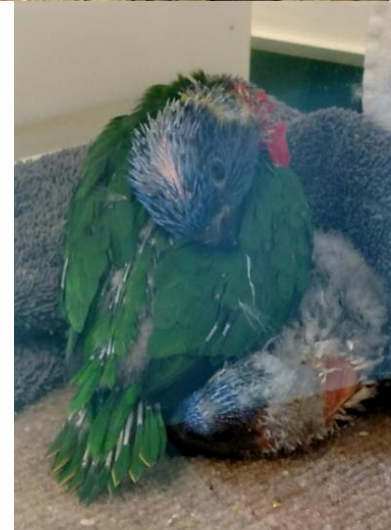
- Formula
 - Mixed by weight
 - Fed by “weight” – assume 1 cc = 1 gram
 - Temp is key!
 - 105-108°F



Feeding

By weight
Assume 1cc
formula = 1 g

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Feeding

- Crop Score

- 0 empty
- 1 1/4 full
- 2 2/4 full
- 3 3/4 full
- 4 4/4 full

- Delay or skip feeds if crop ≥ 2



- Amounts based on proportion of body weight, e.g.,
 - 100 g chick
 - 60% BW per day
 - 4 feeds per day
 - Up 15 cc of formula per feed
- >>>crop 3-4
- >>>ready to eat at next feed



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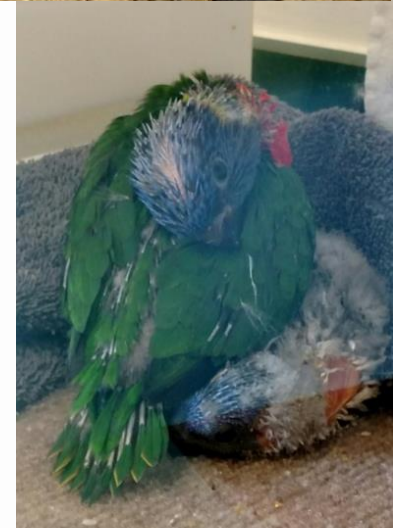
Feeding

- Adding marbles to nectar encourages self-feeding by day 32-34
- Pellet self-feeding by ~day 40
- Wean ~day 50 from handfeeds and remove all formula ~day 60



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Protocols and Records

- Excel spreadsheet
- Standardized format
- Limit transitions to one per day



RIVERBANKS ZOO HAND-REARING PROTOCOL						
2017FEB						
Common: Lory/Lorikeet						
adapted from ZSSD APC July 13						
COCONUT LORY						
Adult body						
	male	female				
	120-150	100-130				
DAY	TEMP(-F)	BROODER	FREQ.	DIET (By weight)	INTAKE	MISC.
0	95	Nest cup w/ tissue in AICU w/ water pan for humidity. Keep brooder covered to simulate nest cavity	Every 1.5 hrs (8x)	Feed oral pedialyte at first feed only, then feed: 8% Kaytee Exact formula 92% bottled drinking water Feed food @ 100-108 °F	~50%	Betadine seal BID Use syringe to feed (If crop is not empty, don't expect to hit high target)
1	94				65-90%	Betadine seal BID
2	93	Add Nomad matting to nestcup		10% Kaytee Exact formula 90% bottled drinking water	85-105%	Betadine seal BID
3	92					
4	91			10% Kaytee Exact formula 90% bottled drinking water	115-135%	
5	90		Every 1.5 hrs (7x)		115-135%	
6	89			12% Kaytee Exact formula 88% bottled drinking water	115-135%	
7	88				115-135%	
8	87				115-135%	
9	86		Every 2 hrs (6x)		135-155%	
10	85			15% Kaytee Exact formula 85% bottled drinking water	135-155%	
11					115-135%	
12		Remove water pan		16% Kaytee Exact formula 84% bottled drinking water	115-135%	
13			Every 2.5 hrs (5x)		115-135%	Try banding, size 7.
15				17% Kaytee Exact formula 83% bottled drinking water	115-135%	
17			Every 2 hrs			

Protocols and Records



RBZG Daily Feed Chart

Hatch Date: 4 June 17
Egg #: 242
Accession#: 13546

Species: Lorikeet Band# Black

Week #: 4

Date	Day	BW(g)	%gain	Daily%Intake	Amt. Day/ feeding (g)	TI. Intake g/%
6 July	31	88.6	0.9	75	66/22	47/53%
Time	0825 1230 1640					Meds \emptyset
Amt.	18 15 14					$\Delta \rightarrow 3x/day$
Resp/F	9r/f 9r/f 9r/f					Temp dry/wet 81/reservoir
7 July	32	89.8	1.4	75	67/22	56/62%
Time	0830 1240 1630					Meds \emptyset
Amt.	19 16 21					$\Delta \rightarrow 22\% Kaytee$
Resp/F	9r/f 9r/f 9r/f					Temp dry/wet 81/reservoir
8 July	33	94.3	5	65	61/20	55g/58%
Time	0825 1235 1630					Meds \emptyset
Amt.	17 18 20					
Resp/F	9r/f 9r/f 9r/f					Temp dry/wet 81/dry
9 July	34	96.2	2	65	62/20	TI. Intake g/%
Time	0830					Meds \emptyset
Amt.	16					encourage nectar self feed add frugivore
Resp/F	9r/f					Temp dry/wet 80/dry
10 July	35					TI. Intake g/%
Time						Meds
Amt.						
Resp/F						Temp dry/wet
11 July	36					TI. Intake g/%
Time						Meds
Amt.						encourage self feeding frugivore
Resp/F						Temp dry/wet
12 July	37					TI. Intake g/%
Time						Meds
Amt.						
Resp/F						Temp dry/wet

Supplements: C (calcium), P (polyvisol)
Feeding Response: NR (no response), PR (poor response), FR (fair response), GR (good response)
Fecal: NF (no fecal), F (fecal), C (cast)

Protocols and Records

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Time	0825	1230	1640				
Amt.	18	15	14				Meds \emptyset $\Delta \rightarrow 3x/day$
Resp/F	9r/f	9r/f	9r/f				Temp dry/wet 81/reservoir
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Amt.	19	16	21			Meds \emptyset $\Delta \rightarrow 22\% Kaytee$
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81/reservoir

Date:	Day:	BW(g):	%gain	Daily%Intake:	Amt. Day/ feeding (g):	TI. Intake g/%
11 July	36					
Time						
Amt.						Meds encourage self feeding frugivore
Resp/F						Temp dry/wet
12 July	37					
Time						Meds
Amt.						
Resp/F						Temp dry/wet



Supplements: C (calcium), P (polyvisol)
 Feeding Response: NR (no response), PR (poor response), FR (fair response), GR (good response)
 Fecal: NF (no fecal), F (fecal), C (cast)

Protocols and Records

- Date and Age

Date: 7 July	Day: 32	EW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 22	TI. Intake g/% Sleep/ 62%
Time	09:30	12:45	16:50			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81 / reservoir



Protocols and Records

- Weight and Gain

Date: 7 July	Day: 32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 22	Tl. Intake g/% Sleep/ 62%
Time	0630	1240	1630			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81 / reservoir



Protocols and Records

- Intake (as per protocol)
- Feed amount
 - Daily total
 - Per feed

Date: 7 July	Day: 32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 22	Tl. Intake g/% Sleep 62%
Time	0630	1240	1630			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81 / reservoir



Protocols and Records

- End of day consumption
 - Total consumed
 - % of the amount allowed

Date: 7 July	Day: 32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 12	TI. Intake g/% <u>56g/62%</u>
Time	0630	1240	1630			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81/reservoir



Protocols and Records

Date: 7 July 2015	32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 22	TI. Intake g/% Sleep/ 62%
Time	0630	1240	1630			Meds \emptyset
Amt.	\emptyset 11	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Residue	9r/f	9r/f	9r/f			Temp dry/wet 81 / reservoir



Protocols and Records

Date: 7 July	Day: 32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day/ feeding (g): 67 / 22	TI. Intake g/% Sleep/ 62%
Time	0930	1240	1630			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Res: F	9r/f	9r/f	9r/f			Temp dry/wet 81 / reservoir



Protocols and Records

Date:	7 July	Day:	32	BW(g):	89.8	%gain:	1.4	Daily%intake:	75	Amt. Day/ feeding (g):	67 / 22	Tl. Intake g/%	Stag / 62%
Time:	0630	1240	1630									Meds	∅
Amt.	∅	11	16	21									Δ → 22% Kaytee
Res:	9r/f	9r/f	9r/f										Temp dry/wet 81 / reservoir



Protocols and Records

Date:	7 July 2011	BW(g):	89.8	1.4 %gain	Daily%intake:	75	Amt. Day/ feeding (g):	67 / 22	TI. Intake g/%	56g / 62%
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Amt.	∅	16	21						Δ	→ 22% Kaytee
Res:	9r/f	9r/f	9r/f						Temp dry/wet	81 / reservoir



Protocols and Records

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Time	0630	1240	1630			Meds \emptyset
Amt.	\emptyset A	\emptyset 16	1 21			$\Delta \rightarrow 22\%$ Kaytee
Residue	9r/f	4r/f	4r/f			Temp dry/wet 81 / reservoir

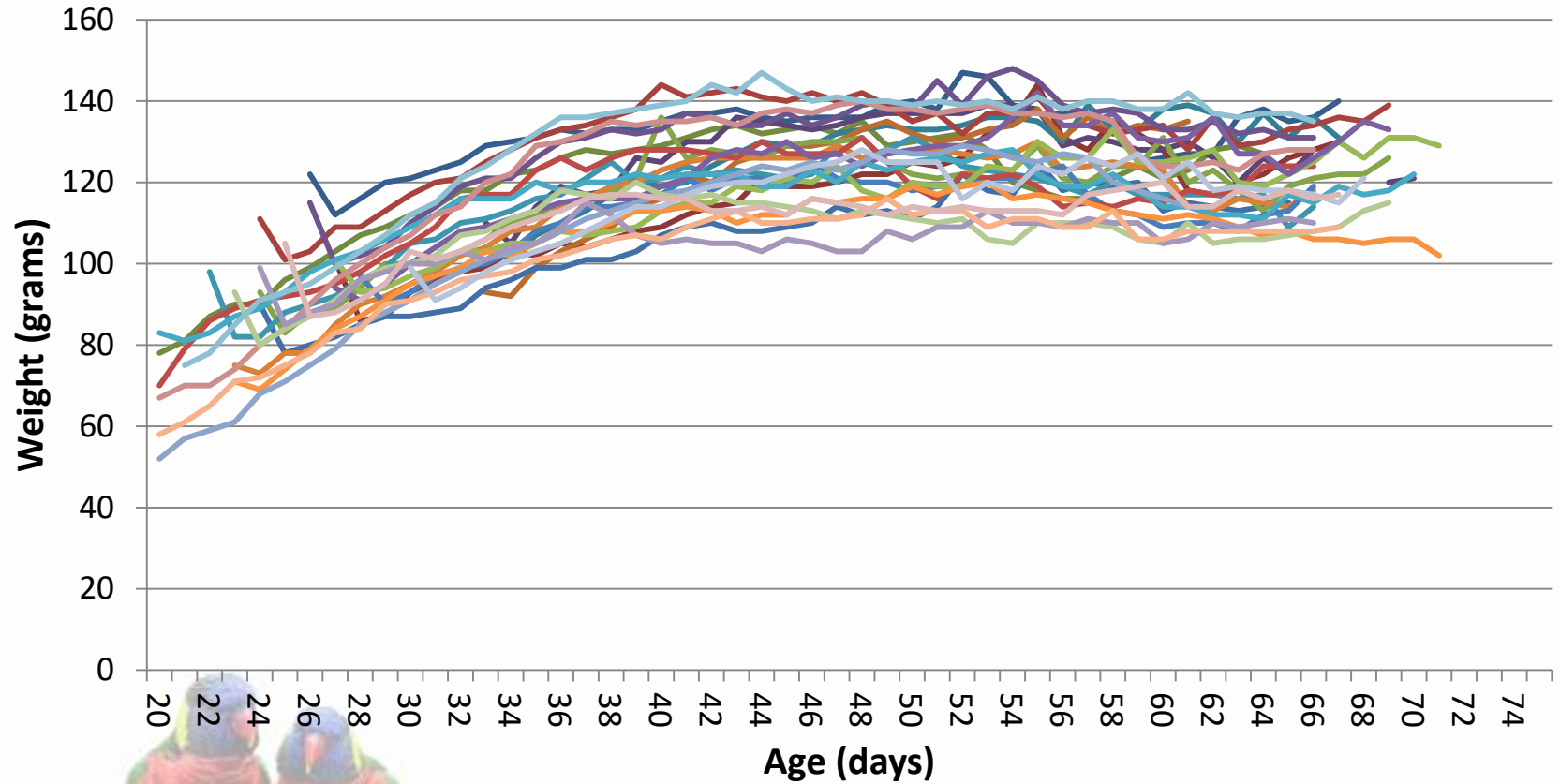


Protocols and Records

Date: 7 July	Day: 32	BW(g): 89.8	1.4 %gain	Daily%intake: 75	Amt. Day's feeding (g): 6 + 1/22	TI Intake g/% Sleep 62%
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Amt.	\emptyset A	\emptyset 16	\emptyset 21			$\Delta \rightarrow 22\%$ Kaytee
Resp/F	9r/f	9r/f	9r/f			Temp dry/wet 81/reservoir



Protocols and Records



Challenges

- Chick Plucking
 - Some of our parents pluck chicks in the nest box.
 - These chicks must be pulled for hand-rearing but do “recover “ completely



Challenges

- Overly Friendly?
 - hand-raised chicks can be “pretty clingy” for their first few months on exhibit
- Not interactive?
 - Breed and parent-rear in other aviaries around the zoo
 - chicks move to the interactive aviary at ~6 months of age
 - chicks appear to “follow the lead” of the hand reared birds



Veterinary

- Annual screening
 - Chlamydia, Salmonella, Mycobacteria, Physical exam, CBC, Chemistry
 - 6-10 birds randomly sampled from the flock
- Concerns
 - Injuries from visitors
 - Parasites
 - monthly ivermectin prophylaxis for cestode and nematode parasites
 - Coccidia



New fun last year!



New fun last year!



New fun this year!



New fun this year!



WE'RE GLAD YOU HAD FUN!
PLEASE WASH UP WHEN YOU'RE DONE.



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