Neonates- Medicine and Husbandry

Rupert Woods*

Introduction

This paper presents some aspects of the medicine and husbandry of psittacine birds raised in the avian propagation unit at Taronga Zoo, Sydney, Australia. Medicine and husbandry of neonatal psittacine birds has been discussed by Flammer (1991) and Flammer and Clubb (1994). A useful summary of this material was presented by Doneley (1992). Jordan (1989) and Voren and Jordan (1992) discuss parrot incubation procedures, hand feeding and nursery management, and theriogenology is discussed by Joyner (1994). Those interested in these areas of avian medicine are referred to these sources for further information.

HUSBANDRY

Management of parent reared birds

- During the breeding season, nesting sites are checked every 24 to 48h.
- Any eggs laid are candled at approximately 2 weeks to check that they are fertile and the embryos active.
- Once hatched, fledglings are visually checked every 24 to 48h.

Indications for pulling eggs or chicks for hand rearing

- Loss of parent bird.
- Known egg breakers.
- Vicious, inattentive or inexperienced parents.
- Ill or debilitated nestlings.

Chicks receiving adequate parental care have food in their crops and yellowish-pink skin. Chicks that have empty crops, act listless and are cool to the touch are receiving inadequate care, may be hypothermic, hypoglycaemic, dehydrated or have bacterial or yeast infections (Flammer and Clubb 1994).

- Double clutching.

Egg management

- Prior to handling eggs or chicks hands are washed with hexafoam.
- Once pulled, the egg is candled and its weight recorded.
- It is then cleaned by dipping into Chloramine 100% (Halasept, Intervet Australia; 6g/L in sterile, 37°C water) and patted dry. It is then placed in an incubator.

* **Veterinary Quarantine Centre, Taronga Zoo, PO Box 20, Mosman NSW 2088**

Incubation

- Environmental conditions vary depending upon species being incubated but humidity is usually between 50 and 60% and temperature 37°C.
- Turning frequency also varies with species and stage of development but is often three times daily, alternating in opposite directions on alternate days.
- Eggs are candled and weighed daily. The aim being to lose 17% of mass during incubation.
- Rate of weight loss is adjusted by adjusting humidity. Humidities greater than 60% are considered to be of detriment to the embryo.
- Frequency of candling increases towards estimated time of pipping.
- Incubators are cleaned between eggs or clutches with Halasept.

Pipping and hatching

- Turning stops just prior to estimated time of internal pipping.
- Once internal pipping starts humidity is increased to 60%.
- The egg is moved off the rollers and placed on its side in the incubator.
- The time from internal to external pipping, and from external pipping to hatch varies but is usually up to 24h and 24 to 48h respectively.
- If necessary hatching can be assisted once the veins within the egg have been absorbed (as witnessed by candling). Intervention prior to this time may be premature and can cause excessive bleeding and death. Hydration of the hatchling whilst in the egg can be maintained by dripping warm, sterile saline onto the egg membranes which may appear opaque and dry.
- Once hatched, the umbilicus is swabbed with betadine.

Hand rearing

- Frequencies, volumes, and percentage solids fed vary with species and stage of development. Taronga Zoo uses complex feeding strategies which will not be presented here but are available on the Regional Avian Artificial Rearing data base (REAAR; Bird Division, Taronga Zoo, Sydney, Australia).
- Simpler recommendations for hand rearing psittacines have been made by Flammer and Clubb (1994):

i. Diet.

25 - 30% solids should be fed to nestlings older than one or two days. It may be beneficial to feed a more dilute diet for the first day after hatching because the chick will be using the contents of its yolk sac for nutrition.

Feed formula at a temperature of 38-40°C.

	Frequency:
Zero to five days old	6 to 10 times daily
Eyes closed	four to 6 times daily
Eyes open	three to four times daily
Feathers emerging	two to three times daily

Chicks less than one week old may benefit from around the clock feeding, but it is not necessary to feed

older chicks through the night. The last feeding can be given between 10pm and 12am, and the first between 6 and 7am.

Adequate weight gain and good morphological development are more important indicators of adequate nutrition than the amount or number of feedings.

The crop should be allowed to empty completely at least once each day (usually in the morning following the final night feeding). This decreases the chances of microbial overgrowth.

It is important to feed young birds the maximum amounts of food early to stimulate good growth and increase crop capacity. However, excessively large meals in very small birds can predispose them to regurgitation and subsequent aspiration. In these birds it is best to feed smaller amounts of food on a more frequent basis.

ii. Temperature.

Temperature should be adjusted for the behaviour of the particular bird. Birds that are too hot will pant and hold their wings away from their bodies; those that are too cold will huddle, shiver and may have slow crop emptying times. Chicks housed at temperatures outside the optimal range will grow more slowly. Suggested temperatures:

Recent hatchlings	33-34°C
Unfeathered chicks	33-32°C
Chicks with some pin feathers	32-29°C
Fully feathered chicks	26-24°C
Weaned chicks	24-20°C

iii. Humidity

50 to 60%

Weaning

- Fledgling may lose 10 to 20% of body weight during weaning.
- The midday feed is stopped, then the morning, then finally the evening feed.
- The bird's weigh is monitored for a further two weeks post weaning to ensure that it can maintain its body weight.
- Weaning can be a stressful period and disease problems can be seen.

Monitoring

- Monitoring is considered essential during hand rearing. It allows:

  Accurate monitoring of the chick's development.
  Builds valuable reference material.
  Is essential in medical management of the neonate.

- The following variables are recorded:

  Body mass
  The daily growth of the chick is monitored by weighing it on reliable, digital scales before and after each feed. This allows growth rates to be determined and quantifies food

intake.
Mass, type and composition of feed fed and frequency
Defecation
Ambient temperature and humidity
Feathering
Demeanour
Time of eye opening
Posture
Medication and medical procedures

- These data are entered on the Regional Avian Artificial Rearing data base.

COMMON MEDICAL PROBLEMS SEEN AT TARONGA ZOO

Avian paediatric medicine has been reviewed by Doneley (1992). The following approach to the ill neonate is used at Taronga Zoo.

- A history and physical examination are performed (see Doneley, 1992).

  Diet and environmental conditions, hygiene practices and feeding methods used by the rearer are assessed and weight charts examined.

- Samples are collected for diagnostic work:
  Microbiology - crop, choanal or cloacal swab.
  Blood- Maximum volume of 0.06% body mass from jugular into lithium heparin. For:

  Haematology
  Biochemistry (glucose, uric acid, creatine kinase, aspartate aminotransferase).

- Hypothermia is corrected by warming to 33-35°C.

- Dehydration is corrected:

  Estimated deficit (10 to 15mL/kg) plus maintenance (50mL/kg/day) using Hartman's solution.

  Intravenously in severely debilitated chicks (10 to 15mL/kg)
  Subcutaneously (between shoulder blades or groin)
  Orally if responsive and not having gastrointestinal problems using compound sodium chloride and glucose oral powder (Gastrolyte, one sachet to 200mL sterile water; Rhone-Poulenc Rorer Australia). Oral fluid therapy can be based on that of Cannon (1991).

- Hypoglycaemia is corrected:

  5% glucose: Hartman's solution (50:50).

- Septicaemia is treated:
  Primary and secondary bacterial problems are common in neonatal birds. When suspected, treatment is often administered immediately because waiting for cultures may be fatal. Most infections are Gram negative bacilli.

If the bird is severely depressed, parental antibiotics are administered intramuscularly or subcutaneously

Commonly used antibiotics include:

Enroflaxacin (Baytril 2.27%, Miles) 15mg/kg intravenously or 30mg/kg bid by mouth

Clavulanic acid (12.5mg/mL) and amoxycillin (50mg/mL) (Clavulox drops, Smithkline Beecham) 2.5mL/kg bid by mouth.

In very young birds an antifungal is often dispensed with an antibiotic to prevent secondary fungal overgrowth eg:

Nystatin (Nilstat Oral, 100 000U/mL; Lederle Laboratories Division) 1mL/300g bid - tid by mouth (administer when crop is empty).

Common neonatal medical problems seen at Taronga Zoo

1. Slow growth

Flammer and Clubb (1994) described development of psittacine birds.

At most stages of development, juvenile birds should gain a certain amount of weight daily (up to 17% body mass). Failure to gain this amount of weight is cause for concern. Almost any disorder will affect the weight gain, and a lack of normal weight gain is often one of the earliest signs of problems. Body weight charts can be developed from records of morphologically normal birds to access normal development; however, there is wide variation in the normal growth rates of chicks depending on individual body conformation and feeding practises. Suggested normal growth rates for selected psittacine species have been presented by Flammer and Clubb (1994).

Growth in psittacines is slow for one to four days following hatching and then accelerates logarithmically until a second plateau stage just prior to weaning when many birds achieve body weights that exceed their adult weight. During weaning this excess body weight is lost as the bird exercises and assumes more adult proportions. Hand-raised birds seldom gain weight as quickly in the initial week of growth as parent reared chicks; however, they usually compensate later and wean at a normal weight.

Altricial birds are usually still naked at one week, by two weeks, pin feathers cover most of the skin, body feathers appear on the back and wings and then on the abdomen and breast. At three weeks the nestling is usually fully feathered. Flying occurs between four and six weeks. Growth characteristics vary with body size and larger species tend to develop more slowly. In macaws eyes usually open between 14 and 28 days, in cockatoos 10 to 21 days. The ears are open at hatching in Old World psittacines and open from 10 to 35 days in neotropical species.

At Taronga Zoo, slow growth has been associated with crop and systemic infections from which *Klebsiella* spp., *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans* have been cultured. These infections are treated with appropriate antimicrobial therapy. Progress is assessed by response to therapy, repeated swabbing and culture, or blood sampling and determination of the white cell series (often at 7 day intervals).

2. Crop stasis

Crop stasis has been associated with *Klebsiella* spp., and *Candida albicans* infections and over stretching.

Feeding is ceased, the crop emptied by aspiration and flushing with warm sterile saline. The concentration of formula fed is diluted and small amounts fed often. Alternatively boiled rice water can be fed. As crop emptying returns to normal, a slow return is made to the normal diet. Appropriate

antimicrobials are administered and if necessary the crop supported with a crop bra until motility returns to normal.

3. Orthopaedic problems

a. Deviation of limbs: correction by strapping or splinting.

b. Toe constriction: massage with DMSO and warm soaks.

Acknowledgements

I would like to thank: Kevin Evans (Divisional Manager, Bird Division, Taronga Zoo) for allowing access to the Avian Propagation Unit at Taronga Zoo and its records; Louise Baume (Bird Division, Taronga Zoo) for her patience and kindness in explaining to me some of the intricacies of neonatal husbandry; and Larry Vogelnest, Frances Hulst, Graham Phelps and Michelle Cunnningham for their guidance regarding avian neonatal medicine. This work was made possible in part by a grant from Ciba-Geigy, Australia.

References

Cannon, M. 1991. Avian fluid therapy, avian fluid and electrolyte dynamics. Pages 14 - 17 *in* Proceedings number 178, Avian medicine, Refresher course for veterinarians. The Post-Graduate Committee in Veterinary Science. The University of Sydney, Australia.

Doneley, R. 1992. Avian paediatric medicine. Pages 155 - 166 *in* G. M. Cross (ed) Annual conference 1992 proceedings. Australian committee, Association of avian veterinarians. The University of Sydney, Australia.

Flammer, K. 1991. Pediatric medicine of psittacine birds. Pages 421 - 430 *in* Proceedings number 178, Avian medicine, Refresher course for veterinarians. The Post-Graduate Committee in Veterinary Science. The University of Sydney, Australia.

Flammer, K., and S. L. Clubb. 1994. Neonatology. Pages 805 - 838 *in* B. W. Ritchie, G. J. Harrison and L. R. Harrison (eds) Avian medicine: principles and application. Wingers Publishing, Lake Worth, Florida, USA.

Jordan, R. 1989. Parrot incubation procedures. Black Cockatoo Press, Prahan, Victoria, Australia. 142 pp.

Joyner, K. L. 1994. Neonatology. Pages 748 - 804 *in* B. W. Ritchie, G. J. Harrison and L. R. Harrison (eds) Avian medicine: principles and application. Wingers Publishing, Lake Worth, Florida, USA.

Voren, H., and R. Jordan. 1992. Parrots, hand feeding and nursery management. Osborne Editions International, Southport, Queensland, Australia. 202 pp.