TARONGA CONSERVATION SOCIETY AUSTRALIA

REGENT HONEYEATER HUSBANDRY GUIDELINES

Anthochaera phrygia

Revised 2013

Photo: Dean Ingwersen

Original Edition Regent Honeyeater Husbandry Manual by Jocelyn Barker, Taronga Zoo 1999.
This Edition 2103 edited by Judith Gillespie Taronga Zoo

Acknowledgements

The establishment and success of the captive husbandry component of the Regent Honeyeater Recovery Plan in the early years can be attributed to the foresight and energy of the following people:

- Taronga Zoo's Graham Phipps, Nick Atchison, Ken de La Motte, Kevin Evans, Chantal Whitton, Louise Baume, Jocelyn Barker, Richard Matkovics, Sarah Brice, Chris Hibbard, Chris Kerr, Margaret Hawkins, Wendy Hartman, Sandy Richardson, Ora McNaught, Fred Peterson and Max Drummond.
- Adelaide Zoo's Phil Digney and Healesville Sanctuary's Michael Miller.
- Recovery Plan Co-ordinators, past and present, Natasha Schedvin, Dave Geering and Dean Ingwersen.
- Local community champions in the field: Eileen Collins and Scott Jessup.

The success of the Captive Component of the National Regent Honeyeater Recovery Plan is a demonstration to the community at large of the important contribution zoos can make to the conservation of endangered species.

Husbandry Guidelines for the Regent Honeyeater

Preface

The development of a husbandry guidelines for the Regent Honeyeater was the principal objective of the Captive Component of the National Regent Honeyeater Recovery Plan 1994-1998, for which Taronga has been the responsible agency (see Appendix I). The first guidelines were prepared by Jocelyn Barker in 1997, following the collection of the initial Regent Honeyeaters from the woodlands of Chiltern, Victoria and the Capertee Valley, New South Wales in 1995. It is remarkable to consider that 15 years have passed since the excitement of the rearing of these nine birds. Husbandry techniques have evolved over this time and developments have been progressively incorporated into Regent Honeyeater management. Since 1995 the captive population has produced 233 offspring (at January 2012) and the captive program participants now involve six facilities. The proof of the husbandry program's success can be measured by the breeding of successive zoo generations and the release to the wild of over 100 birds for the National Recovery Program.

The updated husbandry guidelines are a compilation of husbandry and management knowledge accumulated by the Regent Honeyeater experts in both the aviary and the field, including those keeper and veterinary staff at ZAA accredited facilities and field biologists. The manual is designed to guide Regent Honeyeater care and management for the participants in the ZAA regional management program. It should assist participants evaluate current husbandry practices and make adjustments where necessary, while being cognisant of the dynamic nature of developing such a tool, and that its value is reliant on good records and the sharing of information and experiences.

In 2012 the status in the wild for Regent Honeyeaters has altered little since the inception of the program. It is interesting to reflect that the Recovery Program has been in operation now for a period of what appears to be the maximum lifespan (~16 years , from captive data) of a Regent Honeyeater - and yet there is still much to discover about this species. Given the wild status, a long-term commitment by current Program participants and facilities planning to include Regent Honeyeaters in the future via participation in ZAA's Australian Species Management Program, can be foreseen.

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HUSBANDRY GUIDELINES FOR THE REGENT HONEYEATER

Anthochaera phrygia

1. Introduction

The Regent Honeyeater (*Anthochaera phrygia*) is an endangered woodland honeyeater found on the western slopes of the Great Dividing Range in south eastern Australia. It is a distinctive member of the box-ironbark woodland community and is often cited as a flagship species for the conservation of this habitat.

A National Recovery Program for the species was commenced in 1996 at which time there was no published data on Regent Honeyeaters in captivity, apart from a few mentions regarding historical zoo displays (Degan (1904), Mathews (1906), Campbell (1909). Taronga Zoo had experience with the husbandry of seven honeyeater species in 1996 and undertook the role of receiving wild Regent Honeyeater nestlings for the development of captive husbandry protocols as an insurance mechanism. These species were:

Striped Honeyeater *Plectorhyncha lanceolata*
Spiny Cheeked Honeyeater *Acanthagenys rufogularis*
New Holland Honeyeater *Phylidonyris novaehollandiae*
Blue Faced Honeyeater *Entomyzon cyanotis*
Noisy Friarbird *Philemon corniculatus*
Red Wattlebird *Anthochaera carunculata*

The instigation of the Recovery Program precipitated a range of field studies over the next five years to build a better understanding of the Regent Honeyeater's biology (summarised in Higgins 2001). Concurrently Taronga focused on documenting the husbandry requirements for maintaining the species in captivity, as outlined in the Plan's goals. Updated Recovery Plans in 1999, (Menkhorst, Schedvin, and Geering) and 2009 (Geering and Ingwersen) expanded the captive role to include breeding for release opportunities which have occurred on two occasions.

Recommendations included in the HUSBANDRY GUIDELINES are not exclusive management approaches, diets, medical treatments, or procedures, and may require adaptation to meet the specific needs of individual animals and particular circumstances in each institution.

1.1. Taxonomy and Conservation status

Molecular review of the Meliphagidae family in 2004 identified the Regent Honeyeater as being closely related to the Red Wattlebird and so positioned in the genus Anthochaera, (Driskella & Christidis 2004). Noted similarities extend to behaviour (ibid), egg colour and pattern (Schodde and McKean 1976) and vocalisations (Veerman 1992).

NOMENCLATURE

Class: Aves
Order: Passeriformes
Family: Meliphagidae
Genus: *Anthochaera*
Species: *phrygia*
Subspecies: *none*

- The Regent Honeyeater is currently managed in the Zoo Aquarium Association of Australia (ZAA) as a Population Management Program (PMP) in the Bird Taxon Advisory Group, under the auspices of the Australian Species Management Plan (ASMP 2012).

1.2. Conservation status

AUSTRALIA: Endangered: Commonwealth Environment Protection and Biodiversity Conservation Act 1999 http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna#birds endangered

QLD: Endangered: Queensland Nature Conservation Act 1992

VIC: Threatened: Victoria Flora and Fauna Guarantee Act 1988 Schedule 2

NSW: Critically Endangered: New South Wales Threatened Species Conservation Act 1995 Schedule 1, Part 1.

2. NATURAL HISTORY

2.1. Description

The Regent Honeyeater is a medium sized honeyeater. The head and neck is black, with broad yellow edges to black wing and tail feathers. 'A large patch of bare, buff coloured, warty skin surrounds each eye' (Menkhorst 1993).

Figure 1. Dorsal view of plumage colouration

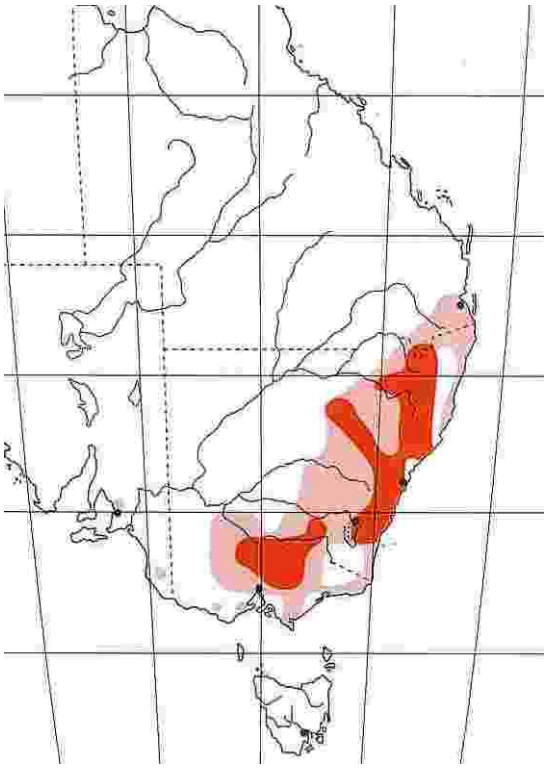
2.2. Morphometrics

Males are larger in most measurements.

Length:	200 – 300 mm	**captive born**
Weights:	Adult female: 36-45 g	39 g (av.), range 37-56 g
	Adult male: 35-45g	44 g (av.), range 32.7-57 g
Wing length:	Male : 109 -116 mm	102 – 115 mm
	Female: 101 -107.4 mm	98 -112 mm

(Higgins, Peter, Steele (2001) and captive data from Taronga records) (See also Appendix IV).

2.3. Distribution



Historically the birds ranged from Adelaide through to just north of Brisbane. They now have a patchy distribution, favouring the dry open forest on the western slopes of the Great Dividing Range.

In NSW regular breeding sites are in the Bundarra District and Warrumbungles in the north, Capertee Valley near Mudgee, as well as around Canberra. The main sites in Victoria are around Chiltern.

For further background to the wild population status see Geering and Ingwersen (2009).

As the Regent Honeyeater is semi-nomadic, highly mobile and unpredictable in its movements, its numbers are difficult to estimate (Menkhorst 1993). Total population size range is estimated between 1000 and 1500.

Figure **2.** Distribution of Regent Honeyeater: breeding (red) and additional records (pink) (from Higgins , Peter, Steele, 2001).

2.4. Habitat

The Regent Honeyeater is associated with key eucalypt communities, specifically containing :

Iron bark, *Eucalyptus sideroxylon*
White box *E. albens*,
Grey Box *E. microcarpa*,
Yellow box *E. melliodora*,
Blakelys red gum E*. blakelyi*.

Other important nectar sources are:
Mistletoe growing on Sheoaks *Casuarina cunninghamianna*
Swamp Mahogany *E. robusta*.

The presence of flowering box/ironbark species during the breeding season is thought to be critical for reproductive success. The honeyeater's box and ironbark woodlands have been severely depleted by European land management practices (Oliver et al 1998, Geering and French 1998).

Figure . 3 Typical Regent Honeyeater habitat – Box Ironbark woodlands of the Great Dividing Range (*Higginsworth*).

2.5. Wild diet

Barker & Vestjens (1984) lists the following food types: seed, nectar, mistletoe fruit (Loranthaceae), white box nectar (*Eucalyptus. albens*), red iron bark nectar (*E.sideroxylon)*, gum exudate from stems of *Eucalyptus* sp, *Banksia* sp., bees, ants and spiders, insects (Hemiptera, Psyllidae, Coleoptera, Carabidae, Scarabaeidae, Elateridae, Bostrychidae, Coccinellidae Chrysomelidae, Apionidae, Diptera, Lepidoptera, Hymenoptera, Tenthredinidae, Chalcididae, Formicidae, Arachnida, Araneae).

16 species of eucalypts and 2 mistletoe species are nectar sources. Insects are gleaned from foliage and bark and hawked in the air. Oliver (2000) found nestlings were fed mostly insects with carbohydrates (nectar, lerps) comprising the rest of the diet. Fledglings were fed mainly carbohydrates (61% of total dietary intake).

2.6. Longevity

Longevity in the wild is unknown. Eileen Collins has reported the re-sighting of a banded fledgling, 12 years after the initial capture. Average lifespan in captivity is 10 years (n= 246). One record of 16 years (i.e alive 2012).

2.7. Ageing and Sexing

Regent Honeyeaters can be aged on the following characteristics:

- Colour of wing coverts. Juveniles have grey-brown plumage. First year birds have brown wing coverts while adults develop black wing coverts (Fig4.)

First year bird brown wing coverts (D. Ingwersen)

- Colour of bare eye patch – juveniles and immature birds have an area of smooth bare blue-grey skin around the eye (Fig. 5). Adults facial skin is bare and warty, and a pale yellow colour (Fig.6). Studies are required to determine if both eye patch colour and wart development is sequential with age. This may be of use in aging birds in the field.

Figure 4. Pale facial ring of first year bird

Figure 5. Facial warts – 2nd year bird

- Gape – a yellow gape indicates juvenile and immature aged birds. In adults it is black or grey (Geering 2010).

Regent Honeyeaters breed in their first year before the full moult and show full moult in late summer / early autumn.

A combination of plumage, size and bare parts can be used to identify sexes (Schodde et al 1992, Geering & French 1998, Geering 2010). 1st year male birds resemble females in both plumage and facial skin (Higgins, Peter, Steele, 2001). Birds in captivity can be surgically sexed under anaesthetic by means of a laparoscope.

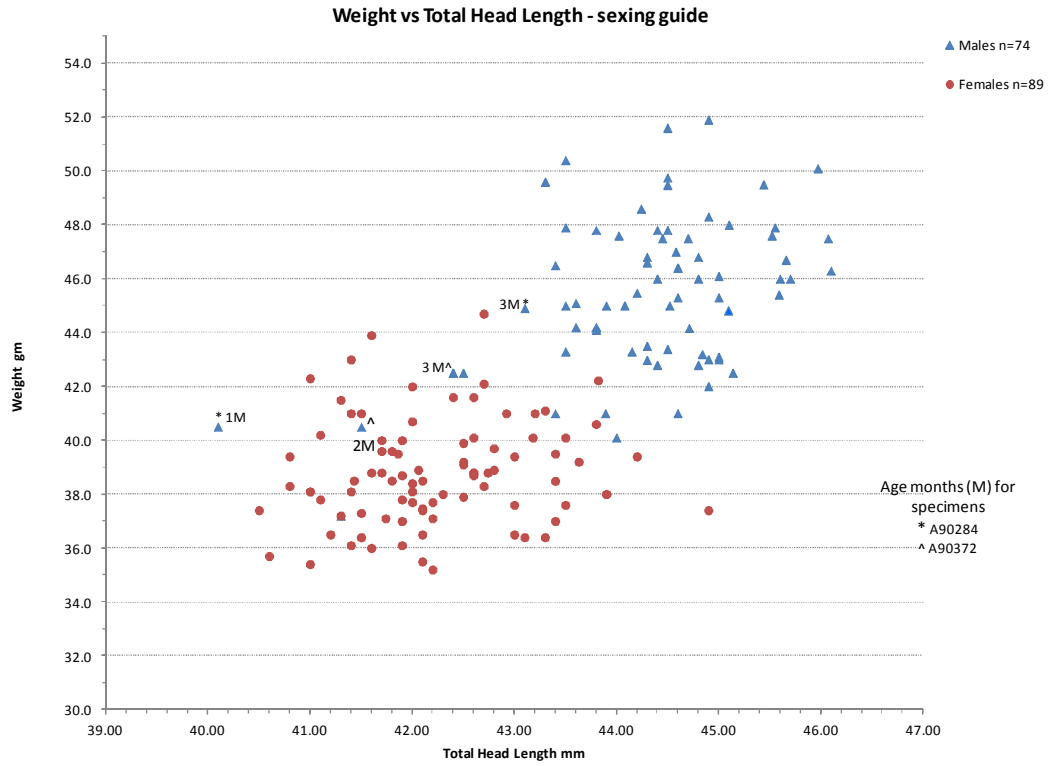
Adult males:

- have a plumage that is a stronger black on the head and body
- have brighter yellow scalloping on the mantle
- ventrally the plain black of their throats extend further down the breast before it breaks into yellow chevrons;
- bare facial skin is more extensively and heavily warted.
- are generally heavier, with longer wingtips, tail and head bill lengths (Ley et al 1996)
- are more vocal than females.

Total Head Length vs Weight

A combination of measurements using weight and total head measurements can provide a guide to sexing birds from about one month's age (Fig. 7), (Geering 2010). The sex data from Taronga records was later confirmed through laparoscopy. There is zone of overlap requiring caution.

Figure 7. Sex differentiation guide using Weight vs Total Head length measurements (Taronga Zoo).



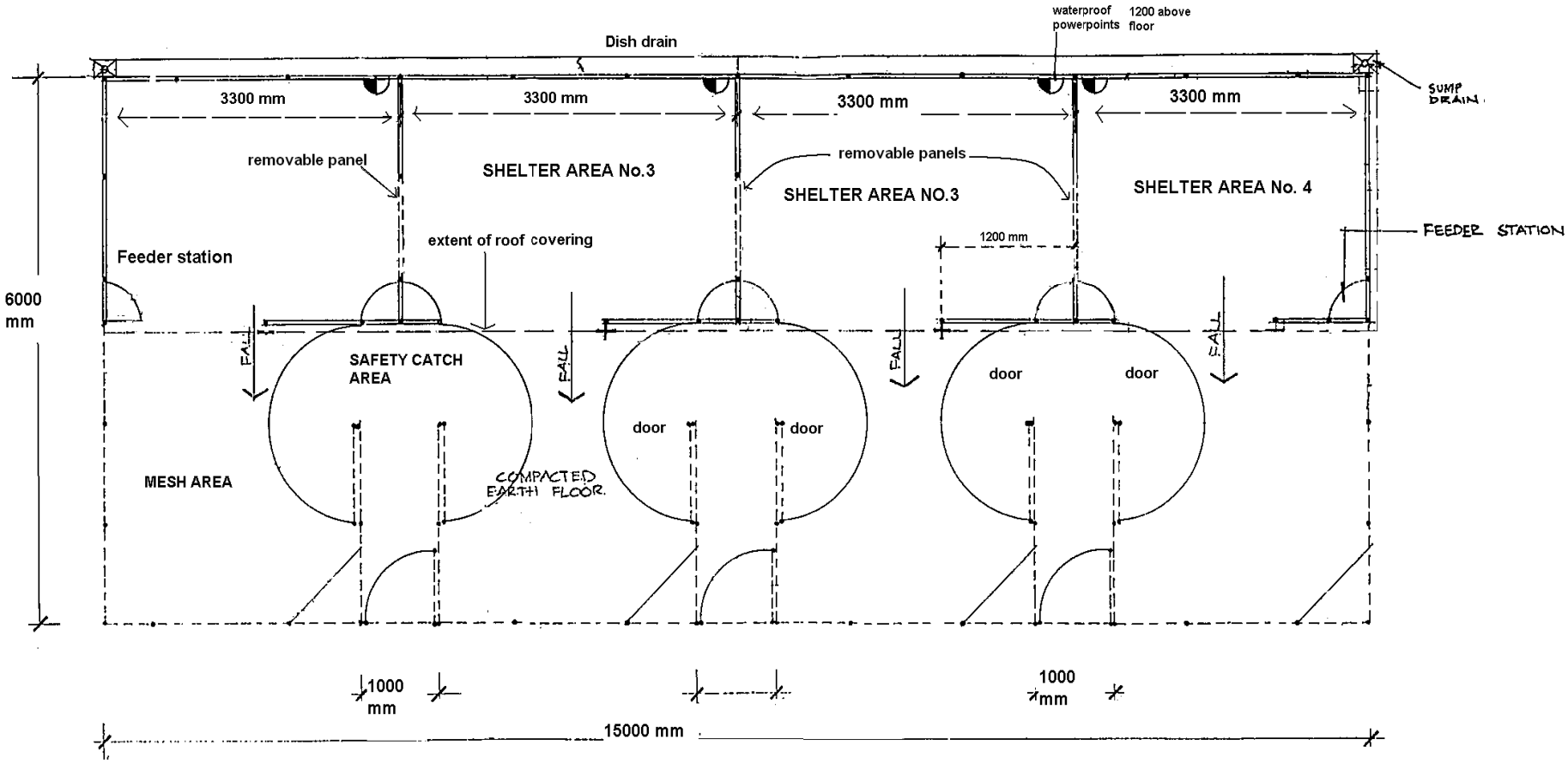
	Total head length range (mm)	Weight range (g)
Males :	40.1 to 46.1	37.2 to 55.6
Females:	40.5 to 44.9	35.2 to 44.7

3. HABITAT DESIGN AND CONTAIN

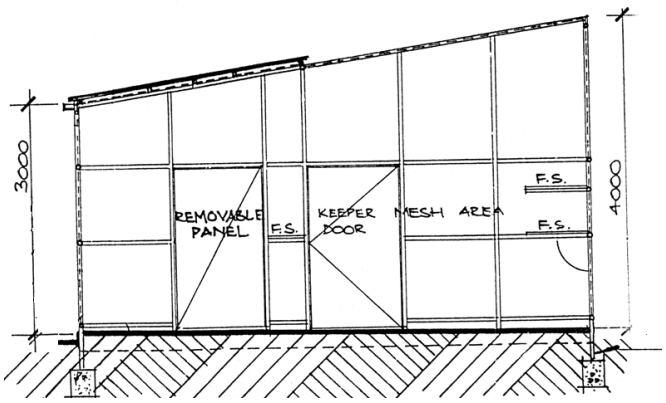
3.1. Physical Environment

Enclosures should :

- Be constructed with sturdy frames, such as steel, and with rodent proof mesh (25 mm x 12.5 mm, 1.6 gauge weldmesh). Avoid tubular steel frames around doors as they can be prone to develop gaps.
- Provide a solid barrier or a gap between neighbouring aviaries housing pairs of breeding birds, as males will attack other males through single wire.
- Provide sufficient flight area, in particular generous height. E.g. 6 m long x 2.5 m wide x 3 m high (Miller 1995). Taronga uses 6 m x 4m x 4 m high.
- Have an entry airlock (double door entry) with inward opening doors to prevent escape.
- Have a shelter area which provides protection from severe and prevailing weather conditions.
- Be rodent proof – e.g. continuous wire mesh (25mm x 25 mm x 1.6 gauge) base beneath the complex. Square section hollow frames for doors enable gaps between door frames to be minimized.
- Provide natural substrate - earth and leaf litter, that is well drained
- Provide natural vegetation for high perching and nesting sites, and plant insect attracting plants. Species such as *Melaleuca amaryllis* provide dens protective foliage attractive for nesting.
- Have watering and bathing points
- Have multiple feeding stations /locations for nectar and other foods
- Have flights positioned to receive easterly light and sun.
- Where multiple pairs are to be housed for breeding, provide a flexible design of multiple connected flights. These can be operated as single or multiple units through use of removable panels/partitions according to the breeding cycle: panels can be removed to facilitate pre-breeding flocking behaviour; Regent Honeyeaters can move swiftly into breeding mode necessitating the ability to close off aviaries to separate pairs.
- Allow for easy maintenance, such as the installation and removal of large /complex perching, etc.
- Include a waterproof 4ft black light on a timer (dusk to dawn) to attract insects for supplementary feeding in the breeding season.


waterproof powerpoints
1200 above floor
Dish drain
SUMP DRAIN
3300 mm
3300 mm
3300 mm
3300 mm
removable panel
SHELTER AREA No.3
removable panels
SHELTER AREA NO.3
SHELTER AREA No. 4
FEEDER STATION
Feeder station
extent of roof covering
1200 mm
6000 mm
FALL
FALL
FALL
FALL
SAFETY CATCH AREA
door
door
door
door
MESH AREA
COMPACTED EARTH FLOOR.
1000 mm
1000 mm
15000 mm

FLOOR PLAN



Temperature requirements: the wide natural distribution of Regent Honeyeaters indicates a tolerance to a highly variable temperature range over a year and given this birds should acclimate to most Australian regions.

4. HANDLING AND TRANSPORT

4.1. Handling procedures

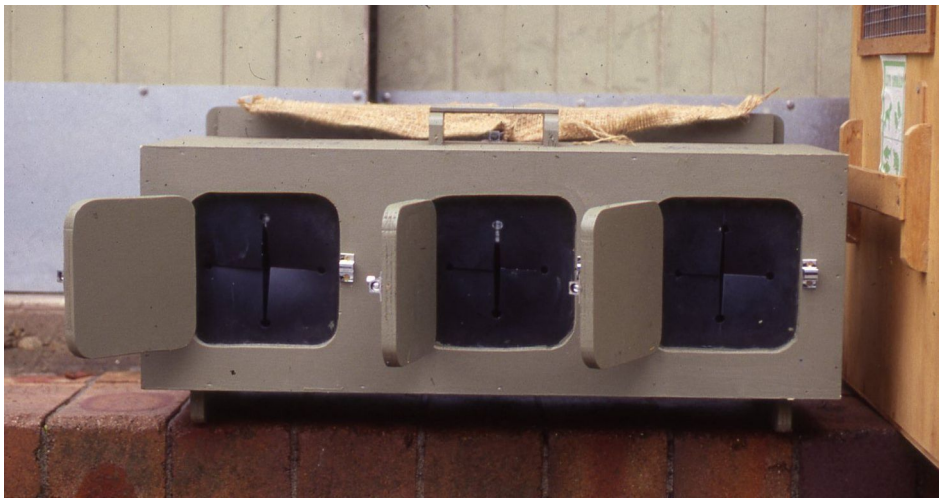
Regent Honeyeaters are challenge to catch in tall aviaries (i.e. greater than 2.5 metres high). It is preferable netting of birds be kept to a minimum and therefore recommended to capture birds using behavioural conditioning, i.e setting a small capture (Naegol) cage furnished with favourite foods. Regent Honeyeaters are curious by nature and birds will enter the cage within a few minutes to enable capture. Birds can then be secured with a small net. On completion of handling, birds should be returned to the 'capture cage' with the food source and allowed to settle and feed for 15 minutes before release into the aviary. This procedure has not proved detrimental to future catching procedures and birds have been seen to voluntarily return to the Naegol cage to feed within 10 minutes of being released.

Small calico bags are used to transport birds between aviaries - bags are used inside-out to prevent the honeyeaters' claws from snagging on any loose threads around the sewn edges of the bags.

4.1.1. Transport

All transport crates should meet IATA standards (2009). Regent Honeyeaters have been transported between national Australian zoos by aircraft since 1998. They travel well in custom made timber crates.

Figure 8. Transport box design with rubber flap entries



S Brice

Rubber flaps fixed over the doorways assist preventing accidental escapes when birds are placed in or retrieved from the transport box.

5. HEALTH REQUIREMENTS

5.1. Routine treatments and examination

i) Provide routine worming, for example, every four months for 21 days treat birds with Piperazine for worms. The treatment can be added to the solid food mixes and a dosage rate of 1g of Piperazine powder to 1 kg of food mix.

ii) Health monitoring can be achieved by regular visual examination and weighing, using a non-intrusive method such as a t-bar perch made of dowel rods, decorated with their favourite food that is placed on top of a set of digital scales.

Once the perch is in place the keeper needs to withdraw as far as practicable to enable the bird to alight, while still being in range to read the scales.

iii) Visual examination – a healthy bird should perch upright on strong legs, have tidy, tight plumage, bright eyes, be active and alert.

Signs of disease include fluffed up appearance, dull eyes, slumped posture, open beaked breathing, tail bobbing, loss of appetite. Droppings should be assessed – normal faecal output is liquid and yellow.

S. Brice

Figure 11 'T' bar weigh station

iv) Examination under manual restraint and anaesthesia.

Birds should be captured quickly to avoid exertion – plan for an appropriate time of day and use a naegol cage to reduce time.

General anaesthesia may be required to avoid the stress of prolonged handling and restraint. Isofluorane and oxygen administered by mask, T-piece and vaporizer is the anaesthetic of choice. Fasting prior to the procedure should be routine, to avoid the risk of aspiration.

v) Blood samples can be collected from the ulnar vein, either conscious or under anaesthesia, by clearing the site, pricking the vein with a 25 gauge needle and collecting the blood drop into haematocrit tubes. Pressure should be maintained on the site for a few minutes following collection to minimize haematoma formation.

5.2. Banding

Banding: Size 5 (Australian Bird and Bat Banding Scheme). Chicks are banded at 6 days age.
(See Appendix VI for details of colour banding and protocol.)

5.3. Cleaning

Ensure daily cleaning of food trays and nectar containers using routine cleaning products.

Cyclic replacement of leaf litter substrates and nesting branches should occur to discourage the development of fungus promoting environments.

5.4. Known Health Problems

5.4.1. Diseases in captivity

Regent Honeyeaters are robust and suffer few significant health problems in captivity. The only significant endoparasite recognised is the coccidian *Isospora lesouefi* sp. n. Despite high numbers of oocysts shed in faeces, disease (coccidiosis) is rare. The ecological significance of the high parasite burden in captive birds requires further investigation and comparison to the wild counterparts (Morin–Adeline *et al.* 2011). No other endoparasites have been found in captive birds. Small numbers of a feather mite (*Trouessartia* ssp.) are occasionally found on captive birds without apparent clinical significance (Vogelnest and Barker 2000, L Vogelnest *pers. comm.*). Prior to 2013 extensive pre-release disease screening of 71 captive bred birds did not reveal any blood parasites and no enteric pathogens were isolated (Vogelnest *et al.* In press). Health screenings in 2013 identified a small number of birds with one of two blood parasites, *Trypanosoma* (an extracellular parasite), and another currently unknown (intracellular parasite). Levels of infection were extremely low and, at press, investigations into parasite identification and pathway are continuing (D. Ingwersen unpubl).

Non-infectious diseases reported in captive birds include trauma (leg band injuries, scalping, cage mate aggression, transmitter associated trauma), metabolic bone disease (in a recently caught wild nestling), yolk peritonitis and failure of chicks to thrive. Infectious diseases have included bacterial dermatitis, stomatitis, ventriculitis, pleuritis, myocarditis, septicaemia and pneumonia (various bacteria isolated including *Pseudomonas aeruginosa, Escherichia coli, Aeromonas hydrophila* and *Klebsiella pneumonia*) and aspergillosis (Australian Registry of Wildlife Health database).

Aspergillosis (caused by *Aspergillus fumigates*) is the most significant infectious disease seen in captive regent honeyeaters, however it is unlikely to be a primary pathogen, with birds succumbing secondary to stress, injury or concurrent disease. Clinical signs include anorexia, weight loss, depression, respiratory distress, vomiting or diarrhea. Open mouthed breathing and tai bobbing indicating increased respiratory effort and wheezing or squeaking respiratory sounds are suggestive of Aspergillosis (Miller 1995).

5.4.2. Diseases in wild

There is limited data available on the parasites and diseases of wild regent honeyeaters. Faecal samples collected from a small number of wild birds that were trapped for banding coccidia, presumably *Isospora lesouefi* sp. n. . Mites on feathers collected from these birds were identified as *Trouessartiai* spp. (Vogelnest 2000).

All deceased birds undergo a routine post mortem examination to determine cause of death. Tissue and organ samples are taken for pathology tests to determine presence of disease or microbes.

See Appendix IV for post mortem findings.

6. SOCIAL ENVIRONMENT

6.1. Social structure

In the wild Regent Honeyeaters change their social patterns with the seasons – single birds, pairs and large parties are seen in all seasons: they are gregarious at good food sources but pairs are seen more often in spring- summer. Outside of breeding birds will form loose flocks (Higgins et al 2001). Once nesting begins pairs will defend their territory and males tend to be the most aggressive with conspecifics and other honeyeaters.

6.2. Habits

Regent Honeyeaters spend just over a third of their day time feeding and slightly less time perching. They take higher amounts of nectar in the morning than at other times of day and hawking of insects peaks in the afternoon (Oliver 2000; McCloskey K. 1999 (unpubl).

In his study Oliver (2000) found 11% of time was spent chasing or being chased by other birds with 13% of time flying, much of this associated with aggressive interactions.

6.3. Introduction and Re-introduction Procedures

The use of naegol cages are recommended for introductions. This involves setting up a portable enclosure within the female's enclosure and placing the male in it so as to confer her some territorial advantage. Allow for a familiarisation period of three to four days. When the male is released ensure a close watch is kept for the first few days.

6.4. Aggression

Males housed together can be aggressive around feed stations and establish a pecking order. Conflicts can result in injuries. This can extend to territoriality associated with multiple food stations which limit female's access to nectar supplies. Providing multiple nectar bottles in different areas is necessary to avoid conflict over resources.

In some instances when males have been swapped after successful nesting has occurred females may direct aggression toward the new male and it may take several weeks for the female to accept the new mate.

Males may use a 'wing shiver' display when trying to displace males. This display can also occur when birds were not close to other individuals. Other signs of aggression are

Fledged chicks are still dependent on parental feeding for 3 to 4 weeks. During this period, the behaviour of the adults, especially the male, towards the fledglings should be monitored frequently for aggression. Juveniles should be removed from adult males soon after they become independent, i.e. 4 to 6 weeks after leaving the nest to avoid any aggressive behaviour.

However groups of up to 6 individuals have been successfully held together in a single aviary where there are multiple feed stations.

6.5. Mixed species compatibility

Regent Honeyeaters can be housed in large aviaries with a wide range of native birds, including finches, pigeons, parrots as well as a other honeyeater species (e.g. Striped Honeyeaters *Plectorhyncha lanceolata)*. Regent Honeyeaters may be aggressive to small bird species, e.g. finches and impact their long term ability to thrive. Regents have bred successfully in mixed species aviaries, that included other honeyeater species.

6.6. Behavioural enrichment

Live moths, meal worms, flies all result in an increase in foraging activity, as does fresh leaf litter. Birds forage in litter for insects; fresh browse from Iron-Bark, Brush Box, Grevillia and Bottlebrush or other available natives.

An adequate sized water dish for splashing in is essential; regardless of weather conditions the birds bathe in the bowls.

7. NUTRITION

7.1. Adult Daily Diet

Daily deit per adult birds:

62.5 ml Wombaroo© nectar mix
37.5 g Insectivore mix.
37.5 g Frugivore mix
25 g Mealworms
80 g Orange

FOOD PREPARATION

- Wombaroo© nectivore powder and water (0.175g per 1ml water)
- Insectivore mix (by weight): 30% Vetafarm© Insect Pro powder; 40% mashed boiled egg : 30% fly pupae.

  Place the Insectivore Powder into a bucket, then using 6 eggs at a time, blend them in the food processor. Using short bursts of power closely monitor the state of the eggs. Ensure that they are of a rough consistency – not too large, but not stuck together and mushy: Repeat with the rest of the eggs, put into bucket and then place fly pupae on top to avoid egg mash drying out and going crusty. Do not mix together, place in fridge until the next morning. Mix all dry ingredients together in the morning. Add water enough to get dry ingredients to bind together but without becoming wet and sticky.
- Frugivore mix (by weight)

  10% Sultanas
  9% Currants
  14% Apples (finely diced ½ cm cubes)
  14% Pears (finely diced ½ cm cubes)
  5% Grapes

12% Frozen Corn
11% Frozen Berries
10% Pawpaw (finely diced ½ cm cubes)
4% Paradise pellets
11% Fine greens
Place sultanas and currants at the bottom of a bucket and mix together. Cut off ends of apples and pears, and any bruises before finely dicing. Place finely chopped apples, then pears, on top. If pears are slightly mushy, place in a metal tub lined with paper towel, instead of putting them straight into the red bucket. Place the chopped grapes in a paper towel lined tub and place on top of mix – the bucket goes into the fridge.

The following morning mix ingredients from the bucket together in a large plastic tub, and add the chopped fruit including freshly diced pawpaw (this will be chopped by keepers in morning), fine greens, paradise pellets, frozen berries and frozen corn, and mix.

- Mealworms are occasionally provided during non-breeding season. During the breeding season after the birds have been separated into pairs, they are provided with additional invertebrates (See 9.10).

Plumage colour loss note

The yellow plumage of the first captive raised birds was noticeably duller and less vibrant than wild birds. This is not uncommon with small passerines in captivity which have red or yellow pigmentation.

A diet trial on two sibling juveniles, using Nekton Gelb (a purpose-made colour supplement for yellow plumaged birds) at 0.25 ml per 100 ml of Wombaroo nectar mix provided over the moulting period produced no significant changes.

7.2. Feeding Method

Feed once per day with an additional insect feed in the afternoon.

- All foods except nectar mix can be placed on small metal dishes on a suspended wire rack.
- Nectar mix is offered in an inverted bottle above the food.
- Orange slice can be spiked on a branch.
- Scatter Mealworms during afternoon feeds if needed

Supply crickets in a large tub on the ground.

8. REPRODUCTION

8.1. Summary

Breeding Season	**August to January**
Nest	**A thick cup of bark strips, bound with cobwebs and lined with soft material, located in a high fork.**
Eggs	**2-3,** **24 x 17 mm** **Dull orange pink to reddish brown, spotted and blotched, particularly at the larger end.**
Incubation	**14 days** **By female only**
Feeding	**Both parents**
Fledging	**14 days**
Independence	**35 days**
Interclutch interval	**30 days**
Average age at first reproduction	**Females : 2 years** **Males : 3 years**

8.2. Breeding System and Reproductive Profile

In the wild Regent Honeyeaters appear to form new pairs annually. In captivity, when given mate choice, they may repair with the previous season's mate.

The reproductive profile of birds in captivity (1995-2011) are summarised as follows:

Average age 1st reproduction	**Youngest recorded**	**Oldest recorded**
male: 3 years	sire: 10 months old	sire: 16 years old
female : 2 years	dam: 9 months old	dam: 14 years old
		first time sire: 15 years old
		first time dam: 7 years old

There is a 75% survival rate for chicks following reaching 1st year, (Hibbard 2011). To date, the most productive female in the captive program started breeding in her second year and over the

subsequent 11 years bred in 8 seasons of which 5 were in succession. In her 12th year this female nested five times between August and January.

In 2012 an original, wild-caught male sired its first ever clutch at 15 years old.

8.3. Seasonality and triggers

The breeding season extends from August – January.

Triggers

In the wild nectar availability and insect abundance are thought to be important triggers for reproductive behaviour. In a full resource situation as in captivity triggers may be difficult to identify. Replicating natural cyclic variations in food quantity and quality, as occurs in the wild, may impose a health and reproductive benefit to birds in bringing them into breeding condition.

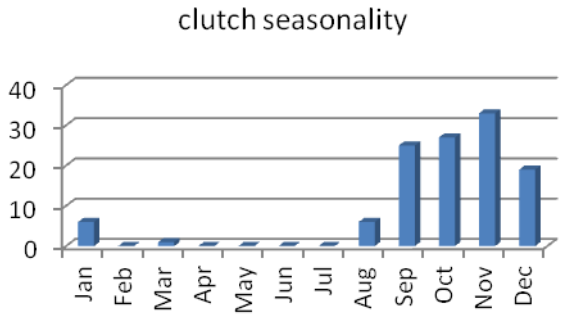


Figure 10. Months in which clutches have been produced in captivity (Hibbard 2011).

8.4. Pre-breeding season flocking and pair bonding

One to two months prior to the breeding season birds targeted for breeding should be grouped together in a single flock. This mimics the natural flocking behaviour of pre-breeding wild birds. Pair bonding is generally quite obvious and once suitable pairs are established they should each be housed in their own aviary.

Where specific pairs are required for breeding management purposes it is easy to split a recently paired set of birds. In one instance at Taronga males were swapped between two pairs and one month later one pair had laid their first clutch. The other pair took two months to establish pair bonding but successfully laid multiple clutches.

8.5. Courtship

Courtship begins in August with an increase in calling and activity by birds.

Signs of pairing are what / check ARKS ?

The male may perform a crouched, wing quivering display to the female in the preliminary period of nest site selection and building (Geering D. and French K. 1998).

8.6. Nests

Wild Regent Honeyeaters nest in the canopies of tall trees, typically using trees with rough bark. Nests are positioned in upright forks between 4 and 25 m above ground at the extremity of branches (Oliver, Ley, Wiliams 1998).

The nest is cup shaped and usually sits tightly within the fork rather than being attached to any part of the limb or branch. To replicate this provide:

- upright forks in aviaries in August.

- Dried, fine grassy material, paperbark, *Casuarina* needles, un-processed raw cotton and cobwebs for nest construction.

Both male and female take part in nest building, although the female appears to choose the nest site and does the majority of the nest construction.

- Nest construction can be fairly rapid – e.g. within 20 hours (when the male is separated from her in a Naegol cage within the aviary). It is not unusual for several nesting sites to be chosen before a nest is fully completed. A pair can spend a number of days building in one site, then totally dismantle it within 24 hours and choose another site.

- Offering cobwebs can encourage, even trigger, next construction.

S Brice

Figure 12a. Regent Honeyeater on nest

Figure 12b. Collected cobwebs

- The presence of keepers observing building to ascertain the nest location does not appear to disturb the birds in their nesting activity.

- Nest sites are often located in the highest position in an aviary, also noting one female nested successfully less than 1m from the ground. After the first clutch is complete, a pair usually finds a different location to re-nest in, although one female was recorded to have used the same nest for three consecutive clutches.

8.7. Diet changes

The numbers and types of invertebrates offered are increased prior to and during breeding.

Newly paired birds are provided with mealworms and moths (caught using insect traps) on a daily basis. Once the pairs have laid eggs they are provided with freshly hatched flies and small crickets

(~1 cm), along with the other invertebrate provisions. These provisions are increased immediately the eggs hatch because they appear to be the preferred dietary item fed to nestlings and fledglings.

8.8. Incubation Period

- Incubation period - 14 days
- by the female only
- commences after the second or third egg is laid
- incubation is intermittent throughout the day; the female may leave the nest for a few minutes up to six times per hour – during this time the male often inspects the nest.

8.9. Clutch size

Mean clutch size is 2 eggs, laid within 2 days (n = 117) (Hibbard 2011).

8.10. Interclutch Interval

This species readily double clutches with an interval around 30to 33 days following the fledging of first chicks. New nest building has been observed there days after fledging. The shortest clutch interval recorded is 21 days. Replacement of a complete clutch removed for cross fostering commenced nine days later. There is sufficient seasonal length to predict the potential to produce three clutches.

8.11. Egg weights and measurements

Average egg measurements:	24.4 x 18 mm (Higgins et al) 24.5 x 17.7 mm (Taronga) 24.18 x 17.08 (Adelaide)
Average egg weight :	3.9g (3.3-4.9 , Taronga) 3.48 g (9 day old) (Adelaide).

8.12. Chick Weights and Development

Figure 13. Growth rate of hand-reared wild caught chicks at Taronga (Brice unpubl).

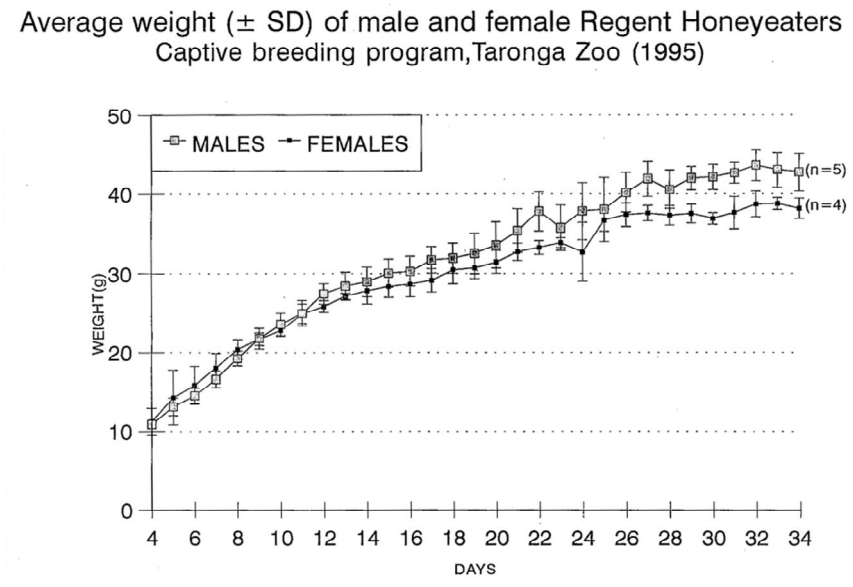
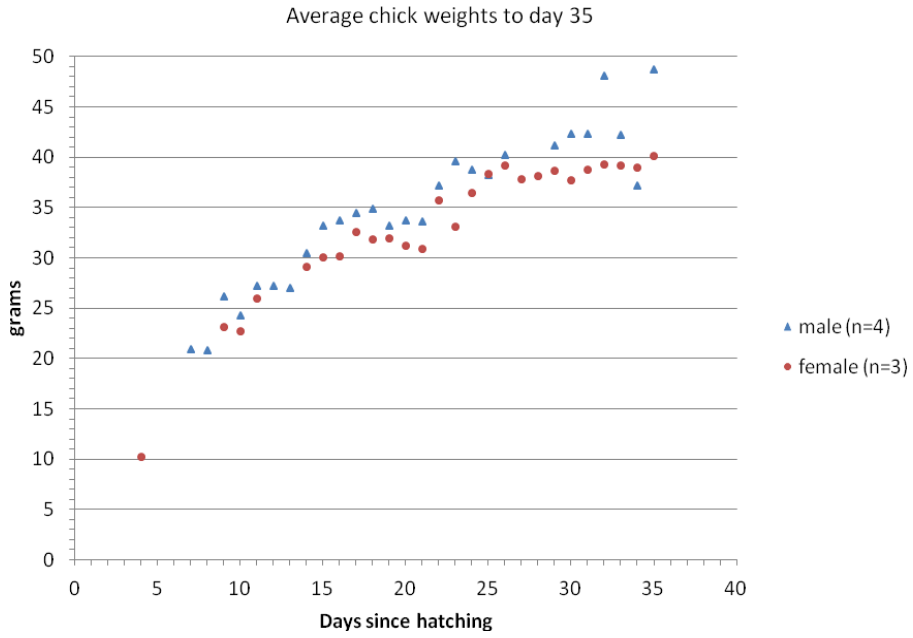


Figure 13. Average chick weight over first 35 days post hatching (Taronga ARKS 1995-2011)



8.13. Care of nestlings

Both male and female feed the nestlings, although the responsibility of feeding appears to depend on:

a. whether the female re-nests soon after the chicks have left the nest, then the male primarily feeds the young

b. if the male is injured or unfit, then the female is the primary feeder.

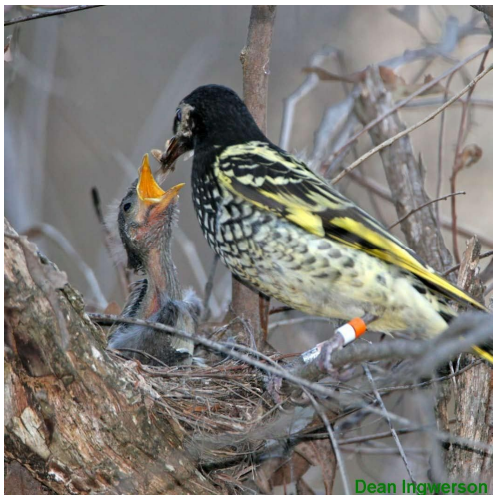


Figure 14. Wild Regent feeding

Live insects are the primary diet fed to nestlings. Oliver's study (2000) of wild birds observed a feeding rate to young of 39 times per hour: adults take nectar directly from flowers to chicks and fledglings; about 10% of food offerings were insects.

In the wild Oliver (pers comm.) observed that the males seem to feed insects more than nectar to the nestlings.
Both parents remove faecal sacks.

Females use a particular vocalisation to obtain a feeding response from the nestlings.

Nest Disturbance

Regent Honeyeaters appear to tolerate considerable nest disturbance. Females have tolerated egg swaps between nests and resumed incubating within four minutes of the return of the eggs. Generally both hand-reared birds and parent-reared fledglings have shown tolerance to captive management practices, such as frequent weighing.

Nests may become increasingly fragile during incubation through wear and tear. Adults don't appear to repair any damage once incubation has started. Care should be taken during chick banding procedures (at around day 6) to avoid further damage caused by claws clutching and snagging the nesting material.

Attempted nest repairs by keepers caused a nesting female to be wary of the nest, avoiding it for 10 minutes after a supporting twig was added below the nest. The female returned after the chicks resumed vocalisations.

8.14. Fledging period

- 14 days Between the first and second week after leaving the nest, the fledglings start feeding independently. They fly well within a week of leaving the nest.

8.15. Removal of juveniles

In the wild once the first clutch has fledged the male will then drive the chicks away so that the female may re-clutch in a 'safe' environment (without fledglings nearby calling near the nest and potentially drawing in predators). However the male continues to care for these chicks within his territory by supplementary feeding them insects and it is during this period that is is assumed that chicks learn the Regent Honeyeater calls. Adults stop feeding the fledglings after the third or fourth week and at this stage it is recommended to remove the fledglings from the parents (especially if the female is re-nesting) since the adult male can become extremely aggressive.

In captivity first clutches are moved out at this equivalent time (~30 days) especially if the female is re-nesting, as the male may become aggressive. The chicks are creched for socialization, however ion this process it has been observed that chicks can develop quite different calls from adults are quite good mimics , picking up calls of surrounding housed and wild species. In this circumstance it is recommended that chicks are housed with or next to non-breeding males with wild type calls , or are played wild recorded calls.

8.16. Hatchling sex ratio

Breeding records in captivity indicate an equal sex ratio (Hibbard 2011).

8.17. Use of Foster Species

Intraspecific cross-fostering has been successfully achieved. In 1997 eggs were swapped between two females that had clutched in synchrony. These clutches were removed approximately 9 days after laying, candled, weighed and measured and immediately replaced into the different nests. The females (hand-reared) were both incubating within four minutes of the return of the eggs. Chicks hatched from this swap were reared successfully.

An analogue species for the Regent Honeyeater has not been used to date however based on phylogenetic and behavioural profiles the Little Wattlebird (*Anthochaera paradoxa*) or the Red Wattlebird (*Anthochaera carunculata)* has been suggested (Wayne Longmore, pers comm.). Fostering success with Noisy Friarbird and Blue-faced Honeyeater (N. Atchison 1992a., 1992b., J. Gillespie unpubl.) would suggest that cross fostering with similar a honeyeater would be achievable.

9. ARTIFICIAL INCUBATION AND REARING

Artificial incubation of Regent Honeyeaters has been undertaken successfully at Adelaide Zoo on just a handful of birds. All data is from Digney (unpubl). Given the positive rearing results achieved with cross-fostering, this low resource option would be a preferred strategy over artificial incubation in a scenario requiring intervention.

9.1. Summary

Incubator	**Still air (preferably)**
Temperature (dry bulb)	**37.2 ^{o} C**
Temperature (wet bulb)	**88-90^{0} F**
Turning	**180^{o}, no more than 8 x per 24 hours**
Weight Loss target	**9-11%**
Internal pip time	**Day 12 , 3.5-28 hours**
External pip time	**12-38 hours**
Brooder temperature	**33-37^{o}C , reduce 3^{o} C daily**

9.2. Incubator type

- Still air – e.g. Brinsea 'Hatchmaker'.
- Hand turn eggs 180 ^{O}, no more than 8 times per 24 hours - (e.g. turning cycle - 7 am, 10 am, 1pm, 4pm, 11pm)

  If it is necessary to use fan forced or auto turn units ensure they are vibration free.

9.3. Incubation temperature and humidity

Maintain a temperature of 37.2^{o} C for the entire incubation and hatching process over 14 days.

To achieve 9-11% weight loss from day 1 the incubator had to be run dry, with a 77-79 ^{O} F wet bulb.

Variables to take into consideration are the geographic location of the nursery and surrounding weather condition. Depending on prevailing conditions a de-humidifier may be needed to achieve sufficient weight loss, or water may need to be added to slow down weight loss.

- Maintain the nursery at a stable temperature of approximately 32 ^{O} C.

9.4. Desired % weight Loss

Target 9-11 % egg weight loss, within an acceptable range of 7-13%.

9.5. Egg Identification and Handling

Mark eggs on their end/s with a felt pen or soft lead pencil prior to setting. Handle eggs carefully when hand-turning: place fingers on the egg ends and not in the middle.

Fertility can be confirmed on Day 2 with a quality candler, and on Day 3 signs of development can be clearly detected.

9.6. Hatch temperature and humidity

Hatcher temperature - 37.2^{O} C , with wet bulb temperature of 88-90^{O} F.

9.7. Normal Pip to Hatch interval

External pip occurs between pm Day 13 and am Day 14.

External pipping range: 3.5 -28 hours

Hatching range: 12- 38 hours

(also see Appendix III)

Hatching process

- On detection of internal pipping, remove the egg to a brooder
- Due to internal pipping being difficult to detect, beginning pm on Day 12 turn eggs 45^{O} either side of centre

Higher weight loss in eggs post external pip occurs in a fan-forced hatcher. This heightens the risk of the chick becoming stuck on the dried out internal membrane, particularly if weight loss has been at the higher range.

9.8. Brooder Type and Design

- Human humidicrib or a still air brooder is recommended, as opposed to fan forced unit.

9.9. Brooder Temperature

TEMPERATURE	HUMIDITY
36° Celsius.	40% - 70%

Temperature to be reduced as the chick is growing and is able to maintain its own body temperature.

Day	hatch - 1	33 - 37°C
Day	2 - 5	30 - 33°C
Day	6 - 10	27 - 30°C
Day	11 - 15	24 - 27°C
Day	16 - 20	20 - 24°C
Day	21 - ??	Room temperature

For fan-forced units take temperature readings near the chick, due to the variable temperature zones found in such units.

A degree +/- for the first 4-6 days is significant for the chick and generally health issues encountered are temperature related.

A small plastic container lined with absorbent paper placed in the brooder can be used as an artificial nest. Absorbent paper or a similar surface with small indents on it is essential to provide traction. Without this the chick can sustain feet cuts from continual slipping and also splayed legs. The chick should have just enough room to turn around in and to be able to prop itself up against the side if it feels the need. The container should be shallow enough for the chick to be able to defecate over the side.

Figure 15. Regent Honeyeater chicks in brooder

Figure 16. Yellow gape and begging response of chick (S Brice).

9.10. Rearing Diet

Food types:

- Electrolyte replacer
- Ox heart, fresh pinky mice, grasshoppers, flies, crickets, moths, mealworms
- Pawpaw, banana, orange

- Wombaroo Lorikeet and Honeyeater Powder, Wombaroo Insectivore Powder (Appendix II).

Feeding Utensils:

- Eyedropper
- Tweezers
- Teaspoon
- Scissors or knife for cutting up food
- Small plastic cup for preparing formula in
- Small plastic cup for keeping formula warm in.

REHYDRATION

Make up electrolyte replacer with pre-boiled water. Feed chicks individual drops of fluid several times during Day 1, along with each food piece dip into the fluid mix. The direct fluid feeding is performed on Day 1 only, thereafter each piece of food is dipped into the fluid prior to feeding until the chick is almost fully feathered.

Effective rehydration and maintenance for the first 5 days is critical for success.

9.11. Feed method

Fresh pinky mice, grasshoppers, crickets, flies, moths and mealworms should all be "clean". Avoid feeding exoskeleton / outer shell of solid foods until Day 3.

Cut Ox heart and pinky mice into 2 - 3mm sized pieces when chick is very young. As chick gets older the pieces can be larger, such as pinky mice cut into 6 pieces.

Cut Grasshoppers into small pieces until the chick can swallow them whole. The legs, wings and head should be removed and discarded.

Wipe moths on a dampened tissue to remove excess body scales and cut into small pieces until chick can swallow them whole. The wings should be removed for the first week.

Tenderise mealworms and cut into small pieces until the chick can swallow mealworms whole.

Equal quantities of peeled orange, pawpaw and banana are put into a blender for only a few seconds until the fruits are mixed and look mashed. This mix should not be like soup. It should have some fluid for probing into and some small pieces of fruit that can still be picked up.

Equal quantities of Wombaroo Lorikeet and Honeyeater nectar powder and Insectivore powder are mixed together with warm water to make into a slurry for dipping the insects etc. into before feeding them to the chicks

9.12. Frequency Fed

Day	Feeds per day	Start/ finish time	Feed schedule	Food types (Offer food using tweezers)
4-6	15	6 am - 8 pm	1 /hour	Very small pieces of ox heart, pinky mice, small pieces of grasshopper, moths or crickets dipped into the Wombaroo slurry. Approx 4 to 8 pieces per feed.
6 -10	13	6 am - 6 pm	1/ hour	Small pieces of ox heart, pinky mice, pieces of grasshoppers, moths, mealworms, crickets or whole flies dipped into the Wombaroo slurry. Approx 6 to 10 pieces per feed.
11 - 14	8	6 am - 6 pm	every 1½ hours	Pieces of ox heart, pinky mice, grasshoppers, moths, mealworms, crickets or flies. Approx 6 to 12 pieces per feed. Provide a small bowl of Honeyeater fruit mix, egg cake mix and insects for ad lib feeding. The chick should be encouraged to pick up and eat small pieces of food and also learn to drink from a nectar feeder.
15 - 20	7	6 am - 6 pm	every 2 hours	Pieces of ox heart, pinky mice, grasshoppers, moths, mealworms, crickets or flies. Feed until satiated (approx 4 - 10 pieces). Provide a small bowl of Honeyeater fruit mix, egg cake mix and insects for ad lib feeding. Encourage chick to pick up and eat small pieces of food and learn to drink from a nectar feeder.
21 - 25	4	7 am - 4 pm	every 3 hours	Grasshoppers, moths, mealworms, crickets or flies. Feed until satiated (approx 4 - 10 pieces). Provide a small bowl of Honeyeater fruit mix, egg cake mix and insects. Encourage chick to pick up and eat small pieces of food and learn to drink from a nectar feeder
26 - 30	2	8 am & 4 pm		Adult diet. Some artificial feeding may still be required if chick's feed response is slow.

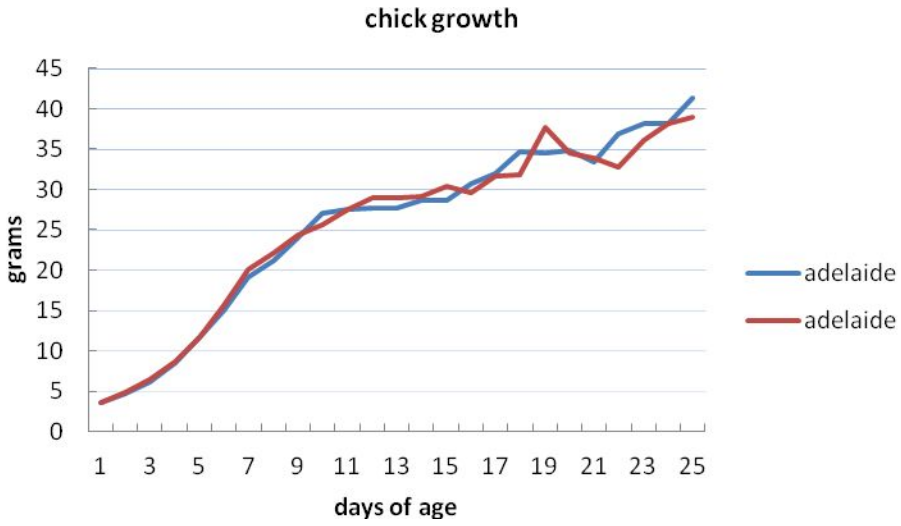
9.12.1. Wild Caught Nestlings

Wild-caught sub-adult birds can be introduced to artificial nectar mix (Wombaroo) by placing their beaks in a dish of nectar prior to transport from the field and then on release in new facilities. The birds quickly adapt to this food source and feed unaided.

Figure 18

9.13. Chick Growth rates - see also 8.10

Figure 19. shows growth rate of 2 hand-reared chicks from Adelaide Zoo



9.14. Marking Methods

9.15. Hygiene

Hygiene in the artificial nest is very important. Chicks produce a faecal sack which is normally passed when it is being fed. The chick will instinctively place its rear end over the side of the nest to pass this sack. The faecal sacks can be picked up with tweezers or a tissue and disposed of.

9.16. Weaning

Weaning should start any time between day 18 and day 22 depending on the chick.

A chick should weigh about 30 - 35 grams at the commencement of weaning and should not be allowed to lose more than 10% of its body weight.

Weaning should be completed within 7 - 10 days.

Every effort should be made to encourage the chick to start eating and drinking on its own. Weaning can be a very stressful time for the chick and weight losses must be monitored closely.

9.17. Fledging

Fledging occurs between 16 and 20 days old after which the chick can be transferred to a cage at least 80 cm x 80 cm x 1600 cm, which allows for exercise and flying practice. Access to food should be provided at all times. Furnish the cage with fresh branches, including bark, leaves and flowers to encourage natural foraging. If a single chick is to be reared it is preferable that a conspecific of a similar age (if possible) be housed nearby from which the chick can learn vocalisation. Weather permitting the cage can be placed outside for the opportunity of sun bathing.

Once the chick is flying well and eating without assistance it should be transferred to an aviary.

9.18. Special Considerations

The transition of a chick from practicing wing flapping to flying is swift. As young birds fly very fast an inexperienced juvenile could suffer a serious or fatal impact injury indoors. Ensure windows, mirrors, screened windows and doors are covered to prevent a chick from flying through them.

9.19. Imprinting

- To avoid imprinting, handling of the chicks is kept to an absolute minimum. Limit unnecessary contact with the chick and avoid talking to the chick or others in the rearing room.

- A tape recording of vocalisations from adult Regent Honeyeaters is recommended to be played while the nestlings are fed.

- Hand puppets painted the same colours as an adult Regent Honeyeater can be used to hold the tweezers when the chick is being fed.

- 8 of the 9 Regent Honeyeater chicks that were reared at Taronga Zoo were reared with a sibling or a chick from another nest. None of these birds showed signs of imprinting. The ninth bird (K) was reared on its own and was released into an aviary with another bird (E) one month after fledging. Although neither of these birds exhibit classic signs of imprinting, they both are very curious when a keeper is working in the aviary, and are

nowhere near as cautious of the keepers as the other 7 birds. Although Bird 'K' bonded with a wild caught female in its first year, it did not sire any chicks until it was 16 years old.

Appendix I Background to the Regent Honeyeater Recovery Plan

The Regent Honeyeater Recovery Plan 1994-1998 (Menkhorst 1996) incorporates previous research and recommendations by Webster and Garnett (1992), Garnett (1992), Menkhorst (1993), and Robinson (1995). The implementation of the plan was funded by Environment Australia under the Endangered Species Act (1992).

Participants in the Regent Honeyeater Recovery efforts include:

- Department of Sustainability, Environment, Water, Population and Community, Australia Government
- Department of the Environment and Natural Resources, Flora and Fauna Branch Victoria
- The New South Wales National Parks and Wildlife Service, Office of Environment
- New South Wales State Forests
- La Trobe University School of Zoology
- University of New England Department of Zoology and the
- Zoological Parks Board of N.S.W. (Taronga Conservation Society Australia)
- Royal Zoological Society of South Australia (Adelaide Zoo)
- Bird Life Australia - NSW Northern and Southern / Australian Capital Territory Groups
- N.S.W Field Ornithologists Club
- World Wildlife Fund
- National Threatened Species Network
- Friends of Chiltern Park
- Capertee Valley Regent Honeyeater Recovery Team
- Greening Australia
- University of New England
- La Trobe University

Appendix II PRODUCTS LISTED

Carophyll Red	DSM Nutritional Products Ltd P.O. Box 3255 CH-4002 Basel Switzerland
Incubator – Hatchmaker H	*Brinsea Products Inc* *704 N. Dixie Avenue* *Titusville*, *Florida*, *FL 32796* , *USA*
Nekton Gelb	NEKTON GmbH Kieselbronnerstr. 28 Germany, D-75177 Pforzheim
Ornithon Calcium powder	Inca (Flight) Company Pty Ltd 22 Forthorn Place, St Marys, NSW (02) 9833 1728
Piparizine	
Wombaroo Nectar mix, **Wombaroo** Insectivore powder	Wombaroo Food Products PO Box 151 Glen Osmond South Australia 5064 ph / fax: (08) 8391 1713 email: wombaroo@adelaide.on.net web: www.wombaroo.com.au
Vetafarm Insecta Pro Powder	3 Bye Street, Wagga Wagga, NSW Australia 2650 Phone: (02) 6933 0400 www.vetafarm.com.au

Appendix III Egg and Chick Development data

A. Egg Weight loss (Adelaide Zoo 2000)

Egg	1	2	3	4	5*	6	7
Fresh wt (Day 1)	3.492 g	3.836	3.836	4.022	4.035	4.421	4.378
External pip (Day 13)	3.180 g	3.572	3.572	3.686	3.591	3.897	3.875
% Loss	8.8%	8.7%	7%	8.5%	11%	13%	11.5%

* chick died Day 13

B. Pip to hatch interval (Adelaide Zoo 2000)

EGG	EXTERNAL PIPING	HATCHING
1	8 hrs	26hrs
2	3.5hrs	36hrs
3	7hrs	12hrs
4	20hrs	28hrs
5	28 hrs	38hrs
6	22 hrs	29hrs
7	14hrs	13hrs

C. Average weights of Adult Birds (>365 days) (Taronga ARKS)

Average female weight > 365 days = 39.7 g

Average male weight > 365 days = 45.5 g

Year of hatching	1997	1999	2000	2001	2005	2006	2007	2008	2009
Average weight (grams)	41.7	46.5	46.8	41.3	45.5	42.3	39.3	44.2	41.7
no. of birds	9	15	2	8	6	7	3	11	17

Appendix IV Mortality summary 1995- 2011

(Taronga Zoo and Adelaide Zoo)

Taronga ID	*Sex*	Age	
-	*unk*	*neonate*	*Neonatal death*
	unk	*embryo*	*Dead in egg*
	unk	*egg*	*Dead in egg*
	unk	*egg*	*Infertile*
990466	*femal*	*adult*	*Leg Fracture*
red/yellow R, red/orange	*femal*	*juvenile*	*Cachexia*
red/blue R, red/ yellow	*male*	*juvenile*	*Cachexia*
-		*egg*	*Dead in egg*
-		*egg*	*Dead in egg*
-		*egg*	*Dead in egg*
970281	*femal*	*adult*	*Ventriculitis*
SZ4 394 L	*male*	*adult*	*Aspergillosis*
SZ4 356	*male*	*adult*	*Wound – left leg, sepsis*
990244	*male*	*adult*	*Aspergillosis*
A10254	*male*		*Epidermitis*
970283	*femal*	*adult*	*Stomatitis*
A10254	*male*	*adult*	*Aspergillosis*
A10253	*femal*	*adult*	*Aspergillosis*
970373	*femal*	*adult*	*Cagemate Trauma, scalping*
A60378	*femal*	*adult*	*Haemocoelom*
27/09/2009	*femal*	*juvenile*	*Aspergillosis*
A10253	*male*	*juvenile*	*Myocarditis*
A10253	*femal*	*juvenile*	*Aspergillosis*
A90208	*male*	*sub*	*Aspergillosis*
A70342	*male*	*juvenile*	*Aspergillosis*
99729pink L	*unk*	*sub*	*Dermatitis*
A90335	*male*	*sub*	*Trauma to both wings*
A90004	*unk*	*sub*	*Laceration to right wing*
960325	*femal*	*adult*	*Hepatopathy*
A80556	*male*	*adult*	*Trauma - cranial*
B10422	*femal*	*nestling*	*Metabolic bone disease*
B00511	*femal*	*adult*	*Pneumonia, Air Sacculitis*
ADELAIDE			
990498	male		*Liver abseccation -*
990515	male		*Cagemate trauma*

Appendix V Colour banding guide

If you see a Regent Honeyeater – we'd love to hear from you!

Regent Honeyeaters are classified as Endangered nationally and Critically Endangered in Victoria.

Sighting records are invaluable. They help us piece together habitat use, seasonal movement and breeding patterns.

Please report any sightings (ASAP) to: Dean Ingwersen

- Regent Honeyeater National Coordinator
- Free Call **1800 621 056** or
- **Dean.Ingwersen@birdlife.org.au**

Details sought:

- Your name and contact details including Phone Number, Address, Email etc
- Date & Time of Observation
- Location – as specific as possible
- Number of Regent Honeyeaters seen
- Colour band combinations (left and right leg) for any banded birds observed
- Any significant activity e.g. breeding.

National Colour Banding Program

Banded Regents have two bands on each leg. Each birds 'four band combination' enables individuals to be uniquely identified - back to the point of capture (wild birds) or release (captive bred birds). A **master colour** band always sits over a Metal band (that includes a unique stamped band number).

Captive bred birds released at Chiltern have the following master colour leg band sequence.

- **2013** release: **White** over Metal **Left** leg
- **2010** release: **Pink** over Metal **Left** leg
- **2008** release: **Pink** over Metal **Right** leg

Wild Regents banded at Chiltern will always have a **Green** master over Metal band. This may apply on the right or left leg.

The remaining leg will have two colour bands. Note: Band colour sequence is recorded from **top to bottom i.e. body to claw.**

birdlife AUSTRALIA

Further information:
Birdlife Australia Woodland Birds for Biodiversity: http://www.birdlife.org.au/projects/woodland-birds-for-biodiversity
Also visit DSE www.dse.vic.gov.au - Native Plants & Animals/Threatened Species & Communities.

Please Turn Over – to Page 2

Department of Sustainability and Environment Victoria

Produced by Glen Johnson, DSE, revised Feb 2013

Band Identification and Recording made easy – use good Bino's!

Band Code: Colour

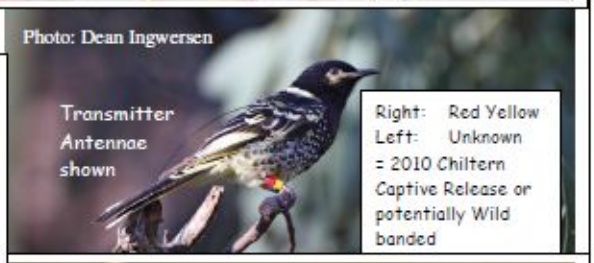
N:	Black
O:	Orange
P:	Green
U:	Mauve
Y:	Yellow
W:	White
B:	Blue
R:	Red
K:	Pink
M:	Metal

Identifying band colours can be a challenge.
The light is not always ideal; birds are almost always on the move, or upside down, or behind foliage or branches. It's not often you get a good view of both legs at the same time. This makes accurate recording of all four bands difficult. Fear not! Any information is worthwhile. Just be honest and record only what you can confirm. If you only make out a definite leg band silhouette or shape, but can't identify any colour details, that's incredibly valuable in itself. If you can only confirm one colour on a particular leg – that too helps us to narrow the options down.
Note: Good binoculars will improve band identification!

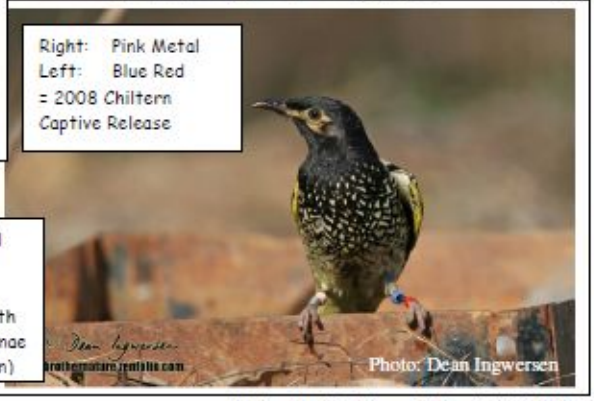
Right: Green Yellow
Left: Pink Metal
= 2010 Chiltern
Captive Release

Right Leg: Unknown
Left Leg: Pink Metal
= 2010 Chiltern
Captive Release
(Individual unknown)

Right: Green Metal
Left: Yellow White
= 2010 Chiltern Wild banded



Right: Red Yellow
Left: Unknown
= 2010 Chiltern
Captive Release or potentially Wild banded



Right: Pink Metal
Left: Blue Red
= 2008 Chiltern
Captive Release

Right: Pink Metal
Left: Unknown
= 2008 Chiltern
Captive Release with transmitter/antennae
(Individual unknown)

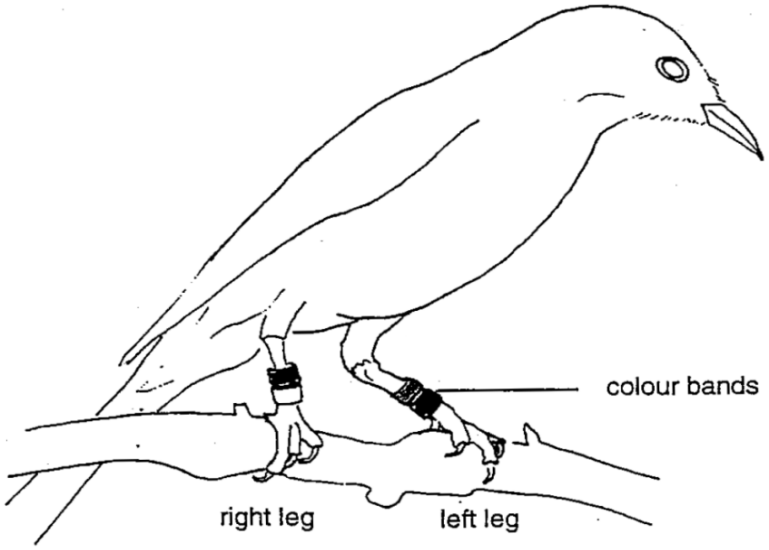
Produced by Glen Johnson, DSE, revised Feb 2013

From: 'Where the Regents Roam' - Newsletter of the Regent Honeyeater Recovery Effort, No.1 Feb. 1995

Colour-banding of Regent Honeyeaters

As part of our attempt to learn more about the movements of Regent Honeyeaters, a colour- banding program has been initiated. Initially, a system of colour- banding by region was used in which birds first banded in a particular location were marked with the colour for that area. This system would be fine for a short time, however if the groups start to mix or move long distances the amount of information that can be collected is very limited. With this in mind, and with the decision that the size 5 colour bands are an acceptable fit for Regent Honeyeaters, Peter Menkhorst has decided to use a system in which each bird is individually marked. To enable a national system without duplication of colour combinations, Peter Menkhorst is coordinating distribution of colour band combinations for use on the Regents.

Currently there are quite a number of colour-banded Regents out there, so please check any birds you see for bands. The colour- banding done so far is as follows:



HOW TO READ COLOUR BAND COMBINATIONS:

The convention for reading colour bands is to cite the colours for the left leg first and then the right leg. For example, the colour combination on this bird would be said as RED OVER BLUE AND GREEN OVER METAL.

or written as:
Red/Blue Green/Metal

NB: Remember that when the bird is facing you the bird's left is opposite to yours.

AREA	LEFT LEG (TARSUS)	RIGHT LEG (TARSUS)
Birds banded in Victoria, number=20	2 coloured plastic bands	1 pale green plastic band over a metal band (silver)
Northern NSW, Andrew Ley et al. number=1	metal band (silver)	green plastic band
Northern NSW, Andrew Ley et al. number=6	1 coloured plastic band	metal band (silver)
Howes Valley, Alan Morris et al. August 1994, number=50	mauve colour band	metal band (silver)
Howes Valley, Alan Morris et al. August 1994, number=7	magenta colour band	metal band (silver)
Capertee Valley, David Geering, October 1994, number=19	2 coloured plastic bands	1 orange plastic band over a metal band (silver)

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