H. Species-specific provisions for birds

a. General considerations

1. Introduction

Birds are used for a broad range of purposes including fundamental research, applied veterinary medical studies and toxicology. Domestic fowl and turkeys are the birds most commonly used in research and are often used in developmental studies and for the production of biological materials such as tissue and antibodies. Domestic poultry are also the most commonly used species in bird welfare research. Fowl are used for pharmaceutical safety and efficacy evaluation, whereas quail and other birds are more frequently the subjects of ecotoxicology studies. The other, less commonly used species such as the pigeon and wild birds are generally used in psychology and fundamental physiology or zoology research. Catching wild birds to use as experimental animals should be avoided unless it is necessary for the purposes of the experiment.

Although birds are essentially built for flight and share the same basic body plan, they have an extremely diverse range of adaptations for locomotion and feeding. Most species are adapted to range over relatively large, three-dimensional areas by one or more means of locomotion including flying, walking, running, swimming or diving, both while foraging and during migration. Many species of birds are highly social and should be kept in stable groups wherever possible.

Additional details are provided for the commonly bred and used laboratory species. It is essential that the housing and care of less commonly used species not included below pay due regard to their behavioural, physiological and social requirements. Housing, husbandry and care protocols for such species should be researched before birds are obtained or used. Advice on requirements for other species (or if behavioural or breeding problems occur) should be sought from experts and care staff to ensure that any particular

species needs are adequately addressed. Information and guidance on less commonly used species is available in the background information document which can found at *[Part B reference link]*.

During agricultural research when the aim of the research requires that the animals are kept under similar conditions to those under which commercial farm animals are kept, the keeping of the animals should at least conform with the standards laid down in the European Convention for the Protection of Animals kept for Farming Purposes (ETS No. 87) and in the related recommendations.

Priority should be given to providing an environment which prevents abnormal behaviours, commonly manifest as inappropriate pecking behaviour. This can be divided into aggressive pecking; feather pecking (where individuals either peck at other birds' feathers or pluck and pull at their own); and pecking at the skin of other birds, which can cause serious suffering and mortality if unchecked. The cause of inappropriate pecking is not always clear, but it is often possible to avoid outbreaks by rearing chicks with access to substrate that enables them to forage and peck appropriately. Chicks of all species should therefore be housed on solid floors with litter.

Prevention is especially important because fowl are attracted to damaged feathers, and the presence of a few feather-pecked birds may therefore lead to the rapid spread of injurious pecking. There are a number of measures that should be employed to avoid outbreaks of injurious pecking wherever possible and to reduce or prevent this behaviour should it occur. These include providing alternative pecking substrates such as foraging substrate, bunches of string, pecking blocks or straw; providing visual barriers; periodically or temporarily lowering the light intensity or using red light; and using light sources that emit UV rays. Anti-pecking sprays are commercially available and can be used to reduce the incidence of injurious pecking in the short term, but it will still be necessary to address the underlying causes of the behaviour. Some strains of domestic bird have been selectively bred so that

inappropriate pecking is reduced and such strains should be researched and used wherever possible.

Methods which cause pain or distress, such as very low lighting (i.e. below 20 lux) for prolonged periods or physical modifications such as beak trimming, should not be used.

Birds housed in a poor quality environment that does not permit them to forage, exercise or interact with conspecifics will experience chronic distress that may be indicated by stereotypic behaviour, for example self-mutilation, feather pecking, and pacing. Such behaviour may be indicative of serious welfare problems and should lead to an immediate review of housing, husbandry and care.

2. The environment and its control

2.1. Ventilation

Many species are especially susceptible to draughts. Measures should therefore be in place to ensure that individuals do not become chilled. Accumulation of dust and gases such as carbon dioxide and ammonia should be kept to a minimum.

2.2. Temperature

Where appropriate, birds should be provided with a range of temperatures so that they can exercise a degree of choice over their thermal environment. All healthy adult quail, pigeon and domestic ducks, geese, fowl and turkeys should be housed at temperatures between 15°C and 25°C. It is essential to take account of the interaction between temperature and relative humidity, as some species will suffer from heat stress within the prescribed temperature range if relative humidity is too high. For species where there are no published guidelines on temperature and humidity, the climate experienced in the wild throughout the year should be researched and replicated as closely as possible. Higher room temperatures than those indicated or a localised source

of supplementary heat such as a brooder lamp may be required for sick or juvenile birds (Table H1).

Table H.1. Guidelines for temperatures and relative humidities for domestic fowl and turkeys, *G. gallus domesticus* and *Meleagris gallopavo*

Age (days)	Under lamp (°C)	Ambient temperature in room (°C)	Relative humidity (%)
Up to 1	35	25 to 30	60 to 80
Over 1 to 7	32	22 to 27	60 to 80
Over 7 to 14	29	19 to 25	40 to 80
Over 14 to 21	26	18 to 25	40 to 80
Over 21 to 28	24	18 to 25	40 to 80
Over 28 to 35	-	18 to 25	40 to 80
Over 35	-	15 to 25	40 to 80

The chicks' behaviour should be used as a guide when setting brooder lamp temperature.

If thermally comfortable, chicks of all species will be evenly spaced in the enclosure and making a moderate amount of noise; quiet chicks may be too hot and chicks making noisy distress calls may be too cold.

2.3. Humidity

Relative humidity should be maintained within the range of 40 to 80% for healthy, adult, domestic birds.

2.4. Lighting

Light quality and quantity are critically important for some species at certain times of the year for normal physiological functioning. Appropriate light and dark regimes for each species, life stage and time of year should be known before animals are acquired.

Lights should not be abruptly switched off or on, but should be dimmed and raised in a gradual fashion. This is especially important when housing birds capable of flight. Dim night-lights may facilitate movement at night for heavy-

bodied poultry strains. Where provided, care should be taken to ensure that circadian rhythms are not disrupted.

2.5. Noise

Some birds, for example the pigeon, are considered to be able to hear very low frequency sounds. Although infrasound (sound below 16 Hz) is unlikely to cause distress, birds should be housed away from any equipment that emits low frequency vibrations whenever possible.

3. Health

Captive-bred birds should be used wherever possible. Wild birds may present special problems in terms of their behaviour and health when in a research facility. A longer period of quarantine and habituation to captive conditions is generally required before they are used in scientific procedures.

Careful health monitoring and parasite control should minimise health risks in birds with outdoor access.

Captive bred birds of a suitable health status should be used wherever possible. Wild birds may present special problems in terms of their behaviour and health when in a laboratory situation. A period of 28 days quarantine should normally be allowed for wild caught birds where possible. During this time the birds can become adapted to the laboratory conditions and their health monitored prior to experimental work commencing. Monitoring should be agreed with a veterinary surgeon and may consist of faecal sampling and examination for the presence of parasites and bacteria, including potential zoonoses such as those caused by Salmonellae and Campylobacter. During this period birds may be treated for the presence of endo- and ectoparasites on advice from the attending.

4. Housing, enrichment and care

Birds should be housed in enclosures which facilitate and encourage a range of desirable natural behaviours, including social behaviour, exercise and foraging. Many birds will benefit from housing that allows them to go outdoors and the feasibility of this should be evaluated with respect to the potential to cause distress or to conflict with experimental aims. Some form of cover such as shrubs should always be provided outdoors to encourage birds to use all the available area.

4.1. Housing

Birds should be housed in socially harmonious groups within the animal enclosure, unless the scientific procedures or welfare requirements make this impossible. Special care is needed when regrouping birds or introducing an unfamiliar bird to a group. In all cases, groups should be monitored for social compatibility on an ongoing basis.

Single-housing of birds for even short periods can be a significant stress factor. (See paragraph 4.5.2 of the General section).

Most species of bird are social for at least part of the year and highly sensitive to family relationships, so the formation of appropriate, stable, harmonious groups should be given a high priority. As there are significant species variations, the optimal composition of groups and at what stage in the birds' lives these should be created should be known before groups are formed and procedures are undertaken.

4.2. Enrichment

A stimulating environment is a very important contributor to good bird welfare. Perches, dust and water baths, suitable nest sites and nesting material, pecking objects and substrate for foraging should be provided for species and individuals that will benefit from them unless there is scientific or veterinary justification for withholding such items. Birds should be encouraged to use all

three dimensions of their housing for foraging, exercise and social interactions including play wherever possible.

4.3. Enclosures – dimensions and flooring

Guidelines for enclosure dimensions are set out in the species-specific provisions for domestic fowl, domestic turkeys, quail, ducks and geese, pigeons and zebra finches. All birds, especially species that spend a significant proportion of their time walking, such as quail or fowl, should be housed on solid floors with substrate rather than on grid floors. Birds can be prone to foot problems, for example, overgrown claws, faecal accumulation and foot lesions such as foot-pad dermatitis due to standing on wet litter, on any type of flooring, and so frequent monitoring of foot condition is always necessary. In practice, it may be necessary to consider a compromise between solid and grid flooring for scientific purposes. In such cases, birds should be provided with solid-floored resting areas occupying at least a third of the enclosure floor. Grid areas should be located under perches if faecal collection is required. To reduce the incidence of foot injuries, slats made of plastic should be used in preference to wire mesh wherever possible. If wire mesh has to be used, it should be of a suitable grid size to adequately support the foot and the wire should have rounded edges and be plastic coated. Mesh size in grid floors should not be greater than 10 x 10 mm for young chicks, and 25 x 25 mm for growers and adults. The wire thickness should be at least 2 mm. The sloping gradient should not exceed 14% (8°).

4.4. Feeding

Feeding patterns of wild birds vary widely and consideration should be given to the nature of the food, the way in which it is presented and the times at which it is made available. Diets that will meet the nutritional requirements of each species and promote natural foraging behaviour should be researched and formulated before any animals are obtained. Part of the diet or additional treats should be scattered on the enclosure floor to encourage foraging wherever appropriate. Dietary enrichment benefits birds, so additions such as fruit, vegetables, seeds or invertebrates should be considered where appropriate even if it is not possible to feed birds on their ‘natural’ diet. Where

new foods are introduced, the previous diet should always be available so that birds will not go hungry if they are unwilling to eat new foods. Some species are more adaptable than others and advice should be sought on appropriate dietary regimes.

As some species, particularly granivores, require grit to digest their food, these should be provided with appropriately-sized grit. Birds will select grit of the size they prefer if material of various sizes is provided. The grit should be renewed regularly. Dietary calcium and phosphorus should also be provided for birds in an appropriate form and at an appropriate level for each life stage, to prevent nutritional bone disease. Any such requirements should be thoroughly researched and catered for. Food can be supplied in feeders that are either attached to the side of the enclosure or standing on the enclosure floor. Space occupied by floor feeders is not available to the birds and should not be included in calculations of pen area. Wall mounted feeders do not occupy floor space but should be designed and fitted with care so that birds cannot become trapped underneath them. Chicks of some species (for example, domestic turkeys) may need to be taught to feed and drink in order to avoid dehydration and potential starvation. Food for all species should be clearly visible and provided at several points to help prevent feeding problems.

4.5. Watering

Water should be provided via nipple or cup drinkers, or as a continuous drinking channel. There should be sufficient drinkers or an adequate length of channel drinker to prevent dominant birds from monopolising them. One nipple or cup drinker should be provided for every three or four birds, with a minimum of two in each enclosure. Supplementary water may also be given as enrichment in birds' feed if appropriate.

4.6. Substrate, litter, bedding and nesting material

Suitable substrates for birds should be absorbent, unlikely to cause foot lesions and of an appropriate particle size to minimise dust and prevent excessive accumulation on the birds' feet. Suitable substrates include chipped

bark, white wood shavings, chopped straw or washed sand, but not sandpaper. Litter should be maintained in a dry, friable condition and be sufficiently deep to dilute and absorb faeces. Other suitable floor coverings include plastic artificial turf or deep pile rubber mats. A suitable pecking substrate such as pieces of straw should be scattered over the floor.

Hatchlings and juvenile birds should be provided with a substrate that they can grip to avoid developmental problems such as splayed legs. Juvenile birds should also be encouraged if necessary, for instance by tapping with the fingers, to peck at the substrate to help prevent subsequent misdirected pecking.

4.7. Cleaning

(See paragraph 4.9. of the General section).

4.8. Handling

Suitable equipment for catching and handling should be available, for example, well maintained nets in appropriate sizes and darkened nets with padded rims for small birds.

If the experimental procedure requires adult birds to be handled regularly, it is recommended from a welfare and experimental perspective to handle chicks frequently during rearing, as this reduces later fear of humans.

4.9. Humane killing

(See paragraph 4.11 of the General section and [other specific guidance (under preparation)])

4.10. Records

(See paragraph 4.12. of the General section)

4.11. Identification

Non-invasive or minimally invasive methods such as noting physical differences, ringing with either closed or split rings and staining or dyeing the

feathers are preferable to more invasive techniques such as electronic tagging or wing tagging. Combinations of coloured leg rings minimise handling for identification, although due regard should be paid to any potential impact of colours on behaviour in some species. When using rings as temporary marking for rapidly growing chicks, regular checking is essential to ensure that the ring is not impeding the growth of the leg.Highly invasive marking methods such as toe-clipping or web-punching cause suffering and should not be used.

b. Additional provisions for housing and care of the domestic fowl, in stock and during procedures

Domestic fowl (*Gallus gallus domesticus*) retain much of the biology and behaviour of the Jungle fowl from which they were domesticated. Behaviours that are most important to the species are nesting (in females), perching and using litter for foraging, scratching, pecking and dustbathing. Fowl are social and should be housed in groups of around five to twenty birds, with fewer males than females in adult groups, for example, a ratio of 1 to 5. Attempts have been made to select strains of fowl for reduced feather pecking or agonistic behaviour. The existence of appropriate strains of this type should be determined, and the feasibility of acquiring them, should be assessed for each project.

Laying hens should have access to nest boxes from at least two weeks before coming into lay and no later than 16 weeks of age. Single- or pair-housed birds should each have access to a nest box, with a ratio of at least one nest box per two birds provided in larger groups. Nest boxes should be enclosed and large enough to allow one hen to turn around. A loose substrate such as wood-shavings or straw should be supplied within nest boxes to promote nesting behaviour. Substrate should be regularly replaced and kept clean.

Fowl should always be provided with the opportunity to perch, peck appropriate substrates, forage and dust-bathe from one day old. Suitable materials for dust-bathing include sand or soft wood shavings. Perches should be 3 to 4 cm in diameter and round with a flattened top. The optimum height above the floor varies for different breeds, ages and housing conditions but perches should initially be fixed at 5 to 10 cm and for older birds at 30 cm above the floor. Perch heights should be adjusted in response to the birds' behaviour by seeing how easily birds can get on and off perches and move between them. All birds should be able to perch at the same time and every adult bird should be allowed 15 cm of perch at each level. More space may be required depending on the species in order to provide sufficient space to avoid aggression. Especially during the establishment of groups, birds should also

be briefly observed during dark periods to confirm that all individuals are roosting.

Fowl are highly motivated to perform ‘comfort behaviour’ such as wing flapping, feather ruffling and leg stretching, which help to maintain strong leg bones. Birds should therefore be housed in floor enclosures large enough to permit all of these behaviours whenever possible. Ideally, birds should be housed with outdoor access; appropriate cover such as bushes is essential to encourage fowl to go outside.

Flooring for fowl should be solid, as this enables the provision of substrate to encourage foraging and possibly help to reduce the incidence of feather pecking. If fowl need to be caged for scientific purposes, they should be housed in enclosures designed to address behavioural requirements. If there are scientific reasons for not providing a solid floor, a solid area with loose substrate and items such as bunches of string, pecking blocks, rope, turf or straw should be provided for pecking.

Fowl strains developed for rapid growth rates (broilers) are highly susceptible to lameness and their use should be avoided wherever possible. If broilers are used, individuals should be assessed for lameness at least weekly and grown more slowly than those reared commercially unless growth rate is essential for the study.

Table H.2. Domestic fowl: Minimum enclosure dimensions and space allowances

Body mass (g)	Minimum enclosure size (m^2)	Minimum are per bird (m^2)	Minimum height (cm)	Minimum length of feed trough per bird (cm)
Up to 200	1	0.025	30	3
Over 200 to 300	1	0.03	30	3
Over 300 to 600	1	0.05	40	7
Over 600 to 1200	2	0.09	50	15
Over 1200 to 1800	2	0.11	75	15
Over 1800 to 2400	2	0.13	75	15
Over 2400	2	0.21	75	15

c. Additional provisions for housing and care of the domestic turkey, in stock and during procedures

Wild turkeys regularly utilise a diverse range of environments and perform a variety of behaviours including dust-bathing, foraging and hunting. The social behaviour of the wild turkey is complex, particularly during the breeding season. Domestic turkeys (*Meleagris gallopavo*) retain many of the characteristics of wild birds but there are some fundamental differences, for example domestic turkeys are unable to fly but have retained the ability to run quickly, and jump and glide, especially at younger ages.

Domestic turkeys are highly social and should not be single-housed. Stable groups should be formed as soon as birds are acquired and adequate monitoring is essential as injurious feather-pecking and head-pecking can occur from the first day of life.

Lameness is a common problem and needs to be carefully monitored. Veterinary advice should be sought on a policy for dealing with lameness.

Turkeys should be provided with perches placed at a height where birds on the ground are not able easily to peck and tug at the feathers of perching birds. However, if birds are older and less agile, the access to perches should be facilitated by special equipment such as ramps. Where this is not possible, perches should be placed at a low height (for example at 5 cm). The shape and size of the perch should be in accordance with the rapidly growing claws of the birds. Perches should be ovoid or rectangular with smoothed corners and made of wood or plastic.

Substrate for dust-bathing should always be provided. Suitable materials are fresh sawdust or sand. Straw bales may be used for enrichment and to provide a refuge from dominant birds, but will need to be frequently replaced and older, heavier birds may need ramps to gain access to them.

Table H.3. Domestic Turkey: Minimum enclosure dimensions and space allowances

Body mass (kg)	Minimum enclosure size (m^2)	Minimum are per bird (m^2)	Minimum height (cm)	Minimum length of feed trough per bird (cm)
Up to 0.3	2	0.13	50	3
Over 0.3 to 0.6	2	0.17	50	7
Over 0.6 to 1	2	0.3	100	15
Over 1 to 4	2	0.35	100	15
Over 4 to 8	2	0.4	100	15
Over 8 to 12	2	0.5	150	20
Over 12 to 16	2	0.55	150	20
Over 16 to 20	2	0.6	150	20
Over 20	3	1	150	20

All enclosure sides should be at least 1.5 m long.

d. Additional provisions for housing and care of quail, in stock and during procedures

Wild quail live in small social groups and devote much of their time to scratching and foraging for seeds and invertebrates on the ground. The preferred habitat of many species is dense vegetation such as grasslands, bushes alongside rivers and cereal fields. Domestication does not appear substantially to have altered quail behaviour, so it is essential to design housing systems that respect this and allow the provision of substrate for scratching, pecking and dustbathing, nest boxes and cover wherever possible. The housing of quail in aviaries or pens as opposed to cages is therefore strongly recommended.

Quail (Coturnix spp; *Colinus virginianis*; *Lophortyx californica*; *Excalfactoria chinensis*) should be group housed in either all female or mixed-sex groups. Where the sexes are mixed, the ratio of males to females should be low (for example, 1 to 4) to reduce aggression between males and injuries to females. It may be possible to pair-house males if stable pairs are formed during rearing. The likelihood of aggressive pecking leading to skin lesions and feather loss is reduced if quail are not kept under intensive conditions and established groups are not mixed.

Quail are capable of extremely rapid startle responses, which can lead to head injuries. Staff should therefore always approach birds slowly and calmly and quail should be provided with cover and environmental enrichment, especially early in life, in order to reduce fear. Quail chicks should have access to coloured objects such as balls, tubing and cubes to alleviate fear of both human beings and novel stimuli in adult birds. Adult birds should be given pecking objects such as stones, pine cones, balls and branches of vegetation. Sand, wood shaving or straw substrate for foraging and a place to which the birds can withdraw should be provided, with additional dust baths of sand or sawdust if the foraging substrate is not suitable for dust bathing. Laying hens should have access to nest boxes and nesting material, such as hay.

If quail need to be housed in cages, consideration should be given to combining enclosures and adding enrichment items. Solid enclosure roofs may make birds feel safer, although this could result in unacceptably low light levels in lower enclosures if birds are housed in racks. Birds should be cage-housed for the minimum possible period because many welfare problems become more severe with age, especially in birds kept for one year or more.

Table H.4. Quail: Minimum enclosure dimensions and space allowances.

Body mass (g)	Minimum enclosure size (m^2)	Area per bird pair-housed (m^2)	Area per additional bird group-housed (m^2)	Minimum height (cm)*	Minimum length of trough per bird (cm)
Up to 150	1	0.5	0.1	20	4
Over 150	1	0.6	0.15	30	4

* The enclosure roof should be made of pliant material to reduce the risk of head injuries

e. Additional provisions for housing and care of ducks and geese, in stock and during procedures

Domestic ducks and geese commonly used in research and testing include *Anas platyrhynchos*, *Anser anser domesticus* and *Cairina moschata*. All waterfowl are primarily adapted for locomotion and feeding in water, which is also very important for 'comfort' behaviours such as bathing and preening. Ducks and geese should be provided with a pond with a mixture of stones and grit on the bottom, both to increase the birds' behavioural repertoire and to encourage adequate maintenance of the feathers. The very minimum that waterfowl should be able to do is immerse their heads under water and shake water over the body. Drinkers and ponds for waterfowl should be located over grid areas with drains beneath to reduce flooding.

Domestic geese and ducks have been selected for meat and egg production, but all breeds retain most of their 'wild type' behaviour and are generally more nervous and easily upset than other domestic birds, especially when they are moulting.

Within twenty-four hours of hatching and throughout the first week of life, water should be provided to facilitate swimming behaviour, but care should be taken to minimise the risk of drowning by, for example, the use of a shallow bowl. After the first week, a shallow pond (dimensions as in table H.6) with large stones on the bottom should be provided with food or grit scattered among the stones to encourage dabbling or diving, as appropriate. In the absence of the parent birds, access to ponds for juvenile birds should only be under supervision to ensure that they can leave the water and do not become chilled. This should continue until they are clearly capable of leaving the water unaided and their waterproof feathers have begun to emerge. It is not necessary to control the temperature of the water. Ponds should be regularly cleaned and water replaced as necessary to ensure good water quality.

Ducks and geese should be housed on solid floors and have sufficient space to permit foraging, walking, running and wing flapping. A complex environment

should be provided, including for example natural or artificial cover, boxes and straw bales. Ducks and geese should always be kept outdoors or have access to outdoor runs unless there is scientific or veterinary justification for keeping them indoors. Birds housed with outside access should be kept secure from predators and should be supplied with a dry shelter to enable them to rest. Vegetation for cover and/or grazing should be provided as applicable. Serious consideration should be given to supplying other features of the habitat that are likely to be important to each species whether birds are housed indoors or outdoors. This includes shallow water with vegetation for dabbling ducks, turf for geese and deeper water with large stones for species whose natural habitat is along rocky coastlines.

Ducks and geese should be housed in appropriately sized groups wherever possible and the amount of time when any individual is left alone should be minimised. Many species become territorial during the breeding season, however, so it may be necessary to reduce group sizes and ensure that there is sufficient enclosure space to reduce the risk of injury, particularly to female birds.

Table H.5. Ducks and geese: Minimum enclosure dimensions and space allowances

Body mass (g)	Minimum enclosure size (m^2)	Area per bird (m^2)*	Minimum height (cm)	Minimum length of feed trough per bird (cm)
Ducks				
Up to 300	2	0.1	50	10
Over 300 to 1200**	2	0.2	200	10
Over 1200 to 3500	2	0.25	200	15
Over 3500	2	0.5	200	15
Geese				
Up to 500	2	0.2	200	10
Over 500 to 2000	2	0.33	200	15
Over 2000	2	0.5	200	15

* This should include a pond of minimum area 0.5 m^2 per 2m^2 enclosure with a minimum depth of 30cm. The pond may contribute up to 50% of the minimum enclosure size.

** Pre-fledged birds may be held in enclosures with a minimum height of 75 cm.

Where these minimum enclosure sizes cannot be provided for scientific reasons *(see paragraph 4.5.1 Introduction of the General section)*

Table H.6. Ducks and geese: Minimum pond sizes*

	Area (m^2)	**Depth (cm)**
Ducks	0.5	30
Geese	0.5	From 10 to 30

***** Pond sizes are per 2 m^2 enclosure. The pond may contribute up to 50% of the minimum enclosure size.

f. Additional provisions for housing and care of pigeons, in stock and during procedures

The various strains of domestic pigeon are believed to derive from the rock dove *Columbia livia*. Rock doves nest and roost on cliffs or within caves, and feral pigeons will utilise sheltered ledges on man-made structures in the same way. In their natural habitat pigeons usually occur in pairs to large flocks, feeding and roosting together, but will defend roosting spaces and nesting areas. Pigeons can be housed in mixed groups, and may lay eggs but will not incubate them if nest boxes are not provided.

Care should be taken when choosing a breed for experimental use, as some strains may show abnormal or undesirable behaviours and should therefore be avoided. Pigeons are primarily seedeaters but are omnivorous, so food containing animal protein should be offered regularly.

Pigeons should be allowed an area sufficient for flight wherever possible, with a separate perching area for each bird along at least one wall of the enclosure. Box perches approximately 30 cm x 15 cm located in blocks should be provided. Branches hung from the roof and scaffolding can also be used for perching. Toys hung from chains should be provided, for example, bird bells, mirrors and commercially available toys designed for pets. Each enclosure should have shallow water baths. Where pigeons need to be handled frequently, ‘nesting areas’ or chambers can be provided so that birds can be trained to retreat to them for capture.

Larger, enriched enclosures with shelving, perches and toys should be used wherever possible rather than ‘standard’ pigeon enclosures. Pigeons benefit from being able to forage and should not be kept on grid floors without strong scientific justification.

Table H.7. Pigeons: Minimum enclosure dimensions and space allowances

Group	Minimum enclosure size (m^2)	Minimum height (cm)	Minimum length of food trough per bird (cm)	Minimum length of perch per bird (cm)
Up to 6	2	200	5	30
From 7 to 12	3	200	5	30
For each additional bird above 12	0.15		5	30

Enclosures should be long and narrow (for example 2 m by 1 m) rather than square to allow birds to perform short flights.

g. Additional provisions for housing and care of zebra finch, in stock and during procedures

Zebra finches (*Taeniopygia guttata*) occur across most of Australia. They are highly mobile, ranging over wide areas in search of food, and live in flocks of up to several hundred individuals. The species is monogamous and sexually dimorphic, as the male's plumage is more ornate than that of the female. The breeding season is not fixed, but is triggered by the availability of ripening grass seeds. Zebra finches use nests for roosting as well as breeding; roosting nests are used more frequently in cold conditions and may be old breeding nests or purpose-built.

Zebra finches are social and non-breeding birds should be housed in groups. Unwanted breeding can be prevented by housing in single sex groups, or suppressed in mixed-sex groups by withholding both roosting and breeding nests and by feeding a diet of dry seeds supplemented with fresh greens, but never soaked or sprouted seeds. Nests should be provided for breeding birds, for example in the form of wicker or plastic baskets or wooden boxes with dried grass, paper strips or coconut fibres for nesting material, but birds will defend these and it is important to monitor behaviour to ensure that sufficient nests are provided. Sprays of Panicum millet should be continually available as dietary enrichment. As zebra finches feed extensively on the ground, birds should be housed on solid floors to facilitate natural foraging behaviour.

Toys, perches and swings designed for pet birds will benefit zebra finches and these should be provided wherever possible. Perches are particularly important for well-being and should be provided at a range of heights to facilitate normal feeding and roosting behaviour. Water for bathing should be provided at least once a week in shallow trays with water of approximately 0.5 to 1 cm in depth.

Fitting zebra finches with coloured leg bands for identification can have significant effects on their social and reproductive behaviour (for example, red

can enhance dominance and green or blue reduce it). Care should be taken in the selection of colours and patterns of leg bands.

Minimum enclosure sizes for zebra finches are set out in Table H.8 below. Enclosures should be long and narrow (for example, 2 m by 1 m) to enable birds to perform short flights. Zebra finches thrive in outdoor enclosures provided they have access to shelter and roosting nests where appropriate. Additional heating should be provided for birds housed outdoors in cold conditions.

Table H.8. Zebra Finch: Minimum enclosure dimensions and space allowances

Group size	Minimum enclosure size (m^2)	Minimum height (cm)	Minimum number of feeders
Up to 6	1	100	2
7 to 12	1.5	200	2
13 to 20	2	200	3
for each additional bird above 20	0.05		1 per 6 birds

For breeding studies, pairs may be housed in smaller enclosures containing appropriate enrichment with a minimum floor area of 0.5 m^2 and a minimum height of 40 cm.