

SPECIES IN AUSTRALIA



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There are many species of deer in the world today while numerous others are now extinct.

The biological diversity of different populations of deer classified as the same species (ie. Red deer and Wapiti/Elk) is uncertain according to taxonomists. Many of the phenotypic (visible) differences seen between groups of deer are thought to have occurred from selective breeding resulting from chance isolation of populations or human intervention rather than genetic differences.

Deer are not native to Australia. All deer on the Australian continent have been introduced since European settlement.

The major species of deer farmed commercially in Australia are Red deer, Fallow deer, Wapiti or Elk and Rusa deer. Chital and Sambar are also farmed but only in small numbers. All are members of the Sub Family Cervinae that is part of the Family Cervidae (see taxonomic summary).

A schematic diagram of the relationship between living species is presented in diagram 1.

Some interbreeding of deer can occur naturally and some can occur with human intervention. For example, Red deer and Wapiti/Elk will freely interbreed and all offspring are fertile. Sambar deer and Rusa deer will interbreed and offspring are fertile. Red deer will join with Rusa deer hinds and while the female offspring are fertile, all male offspring are thought to be infertile. Red deer can successfully join with Sika deer, as can Wapiti/Elk. Fallow deer do not interbreed with any other species.

An example of human intervention by researchers is the successful hybridisation of Red deer and Pere David deer in New Zealand.

Like any other commercial animal breeding programs, selection for particular traits and control of mating can develop lines of animals that have selected traits that are phenotypically superior for example body size, antler weight and body weight. This selection and manipulation of particular traits does not change the biological make up of the animal, a Red deer will always be a Red deer.

Classification of Deer

Deer have probably received less attention than other livestock from most branches of science in recent history, including biologists involved in taxonomy.

Taxonomy can be described as the study and classification of living things into groups according to their structure, origin, colour, etc.

Groves and Grubb [36] suggest that many of the biological relationships between populations of deer have been unclear. Historically, some populations that have been regarded as different species on the basis of their phenotype (physical appearance) have only developed with human intervention.

Groves and Grubb [36] state that previously accepted “Formal classification of deer have been inadequate, yet through repetition have become regarded as unquestioned primary sources of knowledge”.

The inter-relationships between living deer were reviewed in 1987 [36]. The supplied chart- show the relationships between living deer that were developed from [36] and [33].

Choice of Species

The choice of species to farm and the type of enterprise to establish whether it is breeding, growing, velveting or other is influenced by a range of factors including:

- Climate of farm locality (tropical, temperate, cold)
- Species available
- Price of stock
- Personal preferences (species appearance, characteristics)
- Product preferences (venison, velvet, specialist breeding or all)
- Area of land available
- Period of the year when most pasture growth occurs
- Annual profit required
- Proximity to markets (cost of transport for sale)

Deer can be managed in a wide range of environments and can be profitable in Tropical, Mediterranean and Cold climates. There may be deer species best suited for farming in particular environments, based on the climatic zones in which they evolved.

Enterprise type can range from:

- Elite breeding herds that provide improved genetics to multiplier herds or to commercial producers
- Enterprises that produce venison only, velvet only or both
- Enterprises that sell weaners
- Enterprises that buy weaners annually to finish for the market

- Enterprises that produce hybrid animals that are sold as terminal parents for commercial herds producing venison and velvet.

The Deer Industry Association of Australia (DIAA) and State Departments of Agriculture offer extension services that can help intending deer farmers select a species and enterprise type for their locality.

Species Farmed In Australia

Red Deer

Red deer in Australia are thought to be predominantly Red deer originating from Europe with the scientific names:

(*Cervus elaphus elaphus* - Red Deer from Western Europe)

(*Cervus elaphus montanus* - Red Deer from Eastern Europe)

Red deer populations have originated and evolved in many environments throughout the world. There are numerous subspecies and hybridisation is common.

Feral Red deer (*Cervus elaphus elaphus*) populations in Australia developed from Red deer introduced from Europe and northern Asia in the early 1870's. They are adapted to temperate environments and are farmed in most livestock producing areas of Australia.

They are considered to be a large deer and are farmed commercially in many countries including New Zealand and Australia. They cope well with environments ranging from cold and wet to hot and dry to sub tropical. However experience shows that very young calves do not tolerate extreme heat well unless they have access to well shaded areas. Almost half of the deer commercially farmed in Australia are Red deer.

Commercial Red deer farming commenced in Australia in the 1970's and current estimates show that Red deer are one of the two predominant species farmed in Australia. Most farmed stock in Australia are derived from European strains and are based on Australian feral herds (Scottish and German bloodlines) and more recently imported English and to a lesser extent Yugoslavian and Hungarian bloodlines. Red Deer are considered a 'dual purpose' breed, suited to both venison and velvet production.

Summer coat colour of Red deer is a reddish brown colour and in winter when hair is longer their colour tends to be more grey to brown. At birth the coat of Red deer calves carry distinct white spots, which gradually disappear by about 3 months of age.

Mature Red deer show a straw coloured patch on the rump. The hair on the underside of the body is usually a lighter colour than the main coat.

In Australia the breeding season commences in late March or early April and lasts for 6 to 12 weeks. Gestation lasts for about 233 days and calves are usually born in November to January. New antler growth is initiated in August or September each year and if not removed, growth is usually completed by the end of February.

For most of the year Red deer behave and can be managed in a similar manner to cattle. However, during the breeding season males are very aggressive and untrustworthy. They should be left alone (observed only from a distance) unless it cannot be avoided.

Some groups of Red deer have been bred in isolation for many years and although they are biologically the same species, they have developed obvious phenotypic differences. These groups (including Hungarian, German, Warnham Yugoslavian and all other Red deer) should be regarded as strains of the same species. However, different strains may have been bred for specific characteristics that give them a different appearance (antler size, antler shape, body size, etc) and perhaps a commercial advantage over other groups (strains) of Red deer.

Fallow Deer

Scientific Name: (*Dama dama*)

Fallow deer are thought to have originated in Southern Europe and the Mediterranean and are a hardy species with a high reproductive potential. They exist in NSW, Victoria, South Australia, Western Australia, Queensland and Tasmania, and represent the only deer species found in the latter state.

They are considered to be small deer and are suited to commercial farming in many environments. They are farmed in significant numbers in Australia, Canada and Europe. However experience suggest that very young fawns do not tolerate extreme heat well unless they have access to well shaded areas.

A significant percentage (about 50%) of Australia's farmed deer population are Fallow deer.

Coat colour varies markedly although four predominant colours are recognised. They are:

- Common or ginger – reddish brown over the head, back of neck, back flanks and outside of the legs. The back and upper flanks often show white spots in summer
 - a black strip runs the length of the animal's back to the tip of its tail
 - belly and inside of the legs are white to beige and a white rump patch is obvious
- Menil – these animals lack the black markings of the common Fallow and their coat has a lighter hue
 - they show distinct white spots which remain throughout the year
- White – these animals have a white or creamy coat (similar to a goat) with no other colour markings
- Black – black animals are single coat colour animals that are sooty black in summer and grey black in winter when they carry their winter coat.

The breeding season for Fallow deer in Australia is similar to that for Red deer. The season usually begins in April and lasts for 6 to 8 weeks (although males remain aggressive until early August). Gestation persists for about 230 days and fawns are usually born in November to January although births can occur as late as March/April.

Fallow deer are principally venison producing animals as the velvet antler they produce is small so annual returns from velvet production are generally less than for larger species of deer.

Like Red deer, Fallow deer are easily managed although their management is more similar to sheep management than cattle management. Fallow bucks should not be handled during the breeding season and until late July or August unless absolutely necessary. They are very aggressive.

Danish and Hungarian Fallow deer are considered to be the same species as all other strains of European Fallow deer. However, as they have been bred in isolation from other populations of Fallow deer they are considered to be genetically superior for some traits, including body weight and antler formation.

Mesopotamian Fallow (*Dama dama mesopotamica*) originated in the area of the Middle East now called Iran. They are also called Persian Fallow deer and are a subspecies of the genus *Dama*. They are on average about 30% larger and their breeding season begins about three weeks earlier than European

Fallow deer and so offer commercial opportunities to increase venison production by hybridisation with European Fallow. Individuals do not show coat colour variation. Their colour can be described as white spots on a light rusty brown background.

Mesopotamian Fallow are listed as an endangered species by the Convention on International Trade in Endangered Species (CITES). Although the CITES agreement bans the commercial trade in Mesopotamian Fallow deer that originate from pure gene pools, CITES has given an exemption to the ban for captive bred, hybrid Mesopotamian Fallow deer (F2 generation) that are produced by hybrid stock. As no pure Mesopotamian Fallow deer have been introduced into Australia, all progeny that result from interbreeding of imported hybrid stock are unaffected by CITES bans that relate to other Mesopotamian deer.

Canadian Wapiti/Elk

Scientific Name: (*Cervus elaphus canadensis*)

Wapiti are native to North America and Asia. They are often called Elk but the term is misleading. Early North American settlers referred to these animals as Elg or Elk as they reminded the settlers of moose they knew in Europe. In the early 19th Century, in an attempt to use a common name for the animals, the name used by Shawnee Indians (Wapiti) was adopted. The name is pronounced WA-PITI that translates to 'White Rump' in the Shawnee dialect.

Elk/Wapiti are closely related to Red deer and although their management and handling requirements are generally similar to those for Red deer, there are some important differences. They are the largest of all the deer species and are thought to have evolved in Asia and North America.

Original Wapiti imported into New Zealand interbred with Red deer until there were few, if any, pure Wapiti remaining. Although the New Zealand hybrids remained bigger than pure Red deer and retained markings of Wapiti, they are smaller than pure Wapiti animals in North America. (New Zealand Wapiti are about 60% of the size of Canadian Wapiti.)

Differentiation between commonly accepted different subspecies of Wapiti is under constant review by Biologists and Taxonomists. Taxonomists suggest some groups previously thought to be different subspecies are in fact the same subspecies. The subspecies have been mis-named because of phenotypic differences that have resulted from breeding within isolated populations in specific environments.

The predominant sub species of Wapiti farmed in Australia is *Cervus elaphus canadensis*. Groves and Grubb [37] suggests commonly described subspecies including: *C.e. manitobensis* (Manitoban or plains Elk) and *C.e. nelsoni* (Rocky Mountain Elk) are the same species.

Wapiti were only introduced in the mid 1980's, so a relatively small population exists in Australia. There are several major Elk (Canadian Wapiti) breeding specialists in Australia who have for the past 10 years imported superior genetics from North America. Progeny from these farms are now available to breeders.

Wapiti are the largest of the deer species and are used for both velvet and venison production. Wapiti stags have the biggest antlers of all farmed deer and produce the greatest weight of velvet annually.

A common use of Wapiti genetics is in cross breeding programs with Red deer to produce hybrid stock that reach slaughter weight earlier than pure Red deer.

Coat colour of Wapiti is similar to that of Red deer. However they have a large creamy white area over the rump that extends below the tail and to the inside of the upper thighs. The tail is usually the same creamy white colour. Their belly is a rusty red to grey brown colour similar to the majority of the coat. The hair on the neck of mature Wapiti bulls grows long during the rut and resembles a mane.

In Australia the breeding season for Wapiti begins a little earlier than for Red deer. It commences during March/April and lasts until May/June. Pregnancy lasts for approximately 255 days and calves are born from November to January.

Like Red deer, new antler growth is initiated from August to September. If not removed as velvet antler, antler growth is completed by the end of February.

Management of Wapiti is similar to management of Red deer. However, some suggest that multi sire matings should not be undertaken with Wapiti, as a bull's libido can be suppressed if other bulls are in the local area. This does not affect the sequential use of 'back-up' bulls as part of a well-managed breeding program.

Rusa Deer

Scientific Name: (*Cervus timorensis*)

Rusa deer are tropical deer that originated in Asia. Most of the feral Rusa deer in Australia are said to have originated from the Indonesian archipelago.

Two subspecies commercially farmed are Javan Rusa (*Cervus timorensis russa*) and the smaller Moluccan Rusa (*Cervus timorensis moluccensis*). Interbreeding (hybridisation) between the two subspecies has occurred in farmed populations, to the extent that the majority of farmed Rusa in Australia are either Javan or Moluccan x Javan.

Feral populations were established in NSW and the Australian Torres Strait Islands by the early 1900's and commercial farming of Rusa deer commenced in Queensland in the early 1980's. Small Rusa deer farms were maintained in NSW and Victoria in the 1970's and small numbers are present on some farms in Southern states today. Current estimates show that the majority of farmed Rusa deer in Australia are managed in Queensland. Their size is approximately half way between Fallow deer and Red deer. They are usually considered as medium size deer.

Rusa deer are used principally for venison production, although they also produce velvet antler. These animals do not cope well with stresses associated with cold weather, although the stresses can be reduced with very good shelter and high energy feed.

Rusa deer are well adapted to tropical and sub tropical environments and anecdotal owner reports indicate they use unimproved pastures more efficiently than other species of deer and cattle. Their coat colour varies from a reddish brown to dark brown in summer to a dull grey brown in winter. Their brisket and belly is grey/white to beige.

The two species of Rusa are often hybridised with each other for improved performance and both species will hybridise with Sambar Deer. A breeding season for Rusa deer is less defined than for Fallow, Red and Wapiti/Elk. Rusa Deer can breed year round and under ideal conditions can produce three fawns in two years. In Australia most Javan Rusa calve in Autumn [93].

Although less research has been undertaken on Rusa deer, the gestation length is said to be about 220 days and most fawns are born in March and April. Like other deer, Rusa deer grow a new set of antlers each year. Individual stags have their own antler cycle, but most antlers are cast from December to January, to hardening of the new antlers in time for a breeding season that generally runs from June to October.

Advantages of Rusa deer include their temperament, which with training in proper handling facilities allows them to readily accept handling (much like Red deer) and their potential to produce three offspring in two years. Experience of processors suggests a high meat to body weight ratio compared to other species.

Sambar Deer

Scientific Name: (*Cervus unicolor*)

Although Sambar deer were introduced into Australia from tropical environments (India and Sri Lanka), they have demonstrated their ability to adapt well to a range of environments in Australia.

They are considered large deer and from their growth rates and carcass characteristics are suited for the production of venison. However they can be difficult to manage.

Their colour is a uniform grey brown to dark brown but can vary from an almost black colour to a reddish brown. The belly hair is usually a lighter colour than the body and tends toward beige. Sambar hair is very coarse and is larger around the neck (mane like) particularly on mature males.

Sambar deer are well established in the Victorian high country and in small, localised areas of NSW and according to some reports, the Northern Territory. They are usually seen as solitary animals or only in very small groups in the wild.

In Australia there is only one known commercial Sambar deer farm that is located in Victoria.

Sambar deer are usually regarded as solitary animals that show very little herding characteristics. This characteristic makes them less suited to commercial farming than species described to date. Management and movement of these deer must be considered differently to other species. These deer will easily hybridise with Rusa Deer to produce fast growing offspring.

Like Rusa Deer, Sambar Deer can breed throughout the year. Their gestation length is similar to that of Red deer (about 233 days).

Sambar Deer in Victoria are thought to have two common rutting peaks that occur September/October and March/April [28]. Calves are commonly dropped in May/June and November/December.

Chital Deer

Scientific Name: (*Axis axis*)

Like Rusa and Sambar deer, Chital deer originate in tropical environments of India and Sri Lanka. Chital deer are also called spotted or axis deer and are reported to have been introduced into Australia (Queensland) in the late 18th Century [28].

Chital deer are usually confined to the tropical and sub tropical areas of Australia, although small numbers have been maintained in cooler areas where there is adequate shelter in winter.

Chital deer have always been farmed in small numbers. Most Australian Chital farms are in Queensland where they currently number less than 10% of the total farmed deer in Queensland. Nevertheless some commercial farming of the species occurs.

They offer the potential of year round venison production and an inherently high reproduction rate. However the high breeding rate is associated with high quality feed requirements throughout the year that subsequently increases the cost of supplementary feed requirements during the dry season.

As a gregarious species, Chital deer are more easily managed in large mobs. Chital deer are still regarded as a difficult species to handle or farm commercially so their commercial management requires high-level management skills.

They are considered as a venison breed and are visually appealing. Although these deer are regarded by most as difficult to handle, those who have experience in their regular mustering and handling suggest that they can be easily trained and managed with little difficulty if their behaviour is understood.

Their coat is a rusty red colour evenly marked with large white spots. They have an obvious dark strip along the back line while the belly is white and legs are off white to beige. A white patch is obvious on the throat and the muzzle is darker than the remainder of the face. The tail of Chital deer is larger than most other deer.

Chital deer hinds do not have a defined breeding season. Although a herd of males can remain fertile all year, fertility and libido of individuals in a group tends to be cyclic. However, in Australia most Chital stags are in hard antler in the first half of the year and as a consequence a majority of calves are born in the second half of the year. Like Rusa deer, Chital deer are capable of producing three offspring in two years. Twinning is not unusual in Chital deer [28].

Gestation is estimated to be about 230 days. Main advantages of Chital deer include their high reproduction potential and lean, high quality venison.

Disadvantages include their susceptibility to cold and stress associated with inappropriate handling.

Summary Comparisons

Table 1 shows a broad comparison of species of deer that are farmed in Australia. The data displayed is intended as a guide and only relates to animals that are 'pure'. Factors that should be considered when using Table 1 are:

- Hybridisation between sub species may affect live weights and growth rates
- Individual strains within a species group may be bred for particular characteristics (body, weight, velvet antler weight, age at maturity etc) that influence the data in Table 1
- The weight of animals varies throughout a year and is influenced, among other factors, by production status, nutrition and age
- Change in day length influences the mating season, so the environment where animals are maintained may affect the mating season and time of parturition
- The gestation period can vary by up to seven days from the guide figures shown
- Weaning weight assumes animals are weaned at 16 to 20 weeks of age

Species In Australia

FEATURES	FALLOW	RED	CANADIAN WAPITI/ELK	JAVAN RUSA	SAMBAR	CHITAL
Classification	<i>Dama dama</i>	<i>Cervus elaphus elaphus</i>	<i>Cervus elaphus canadensis</i>	<i>Cervus timorensis russa</i>	<i>Cervus unicolour</i>	<i>Axii axis</i>
Terminology						
Male	Buck	Stag	Bull	Stag	Stag	Stag
Female	Doe	Hind	Cow	Hind	Hind	Hind
Young	Fawn	Calf	Calf	Fawn	Calf	Calf
Breeding pattern	Seasonal	Seasonal	Seasonal	All Year	All Year	All Year
Mating Season (Rut)	April to June	April to June	March to April to late September	Often peaks late June September/October	Often peaks in and March/April	
Average Gestation (days)	230	233	255	252	233	234
Parturition	November to January	November to January	November to January	Variable, but often March to April	Peaks in May/June and November/December	
Birth weight (kgs)	4.0	8.0	14.5	4.8	6.0	3.0
Weaning (3 month) weight						
Male (kg)	20	50	85	30	55	25
Female (kg)	18	40	70	24	30	20
15 month weight						
Male (kg)	50	110	220	65	120	50
Female (kg)	35	80	170	60	85	38
Mature weight						
Male (kg)	90	220	400	140	260	90
Female (kg)	42	100	230	90	180	45

Table 1: Species Comparisons at a Glance