GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Dama dama***

Dama dama **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Artiodactyla	Cervidae

Common name

Synonym

Similar species

Summary

Fallow deer are one of the most widespread cervids, with evidence of significant human impact on its distribution since the Romans. Today it's found throughout Europe, in southern South America, Africa, most of Australia and North America. The only native population believed to still remain is found in Turkey. Because of its extensive impacts on forests and agriculture, through overgrazing and competition, it's widely considered an invasive species. Although it is also partially protected throughout its range because it is a priced farming and recreational hunting resource.

view this species on IUCN Red List

Species Description

Fallow deer exhibit sexual dimorphism. The bucks (males) are larger than the hinds (females), weighing around 90kg with a standing height of 95cm, compared to around 40kg and 80cm for hinds. Fawn show a spotted pattern on a light brown coat, and the deer can retain these white spots into adulthood. The coat colours are variable, including red, brown, nearly black and fawn. The ventral side is white, and the rump-patch is white with a black margin. Tails can have a length ranging from 15 to 24cm. The dimorphism is also exhibited in the presence of antlers in bucks and absence in hinds. These can measure up to 70cm in height and are palmate at their distal ends with multiple points. Antler measurements also include a front outer curve from 635 to 940mm and a tip-to-tip distance of 305 to 762mm (Jensz, 2013). Bucks grow antlers yearly, during the course of 120 to 150 days, after which the velvet around them dries and is shed (Rolf & Enderle, 1999). As many deer, Fallow Deer have characteristic vocalizations, which consist of groans with individual phonic structure that may serve as a signature for each individual (McElligott et al., 1999). This species has two dentitions, one of 20 teeth that is later replaced by a second of 32 teeth. Its dental formulae are: Deciduous i 0/3, c 0/1, pm 3/3 x 2 Permanent i 0/3, c 0/1, P 3/3, M 3/3 x 2 This species lacks upper incisors and canines (Chapman & Chapman, 1970).

Notes
Taxonomic notes Dama dama subsp. mesopotamica (Brooke, 1875) is included as a subspecies by multiple authors. The Red List assessment for this species follows a large study of the phylogeny of old world deer by Pitra et al., (2004), treating it as a separate species. This profile follows the same taxonomy. (Masseti & Mertzanidou, 2008) Hybrids exist in captivity, which means that escapes from such farms could establish introgressed populations. European and Mesopotamian Fallow Deer have been crossed to increase the size of farmed stock in Australia and New Zealand (Jensz, 2013). Native range status Only one surviving population of Fallow Deer exists in its native range. This small, genetically distinct population of around 30 individuals resides in the Telmessos National Park, in Turkey. The population was severely affected by poaching in its former distribution and has decreased by more than 50% in the last decade (Masseti & Mertzanidou, 2008). Natural Predators Natural predators include wolves, cougars, lynx, bears, mountain lions, bobcats and coyotes. Foxes are also capable of eating fawns (Jensz, 2013). Pathogens Fallow Deer are hosts to a very wide range of pathogens, which poses a concern of disease spread by feral populations in introduced ranges. They can be affected by Bluetongue, Foot and mouth disease, West Nile virus, Screw worm flies, Vascular stomatitis, Chronic wasting disease, ticks and Leptospirosis, Bovine tuberculosis (Mycorbacterium bovis), Ashworthius sidemi, Nematodirus filicollis, Aonchotheca bovis, Oesophagostomum radiatum, Heptospira spp., Salmonella spp., Escherichia coli, B. capreoli, Brucella spp., Listeria monocytogenes, Chlamydia pisttaci, Coxiella burnetii, Bovine rhinotracheitis virus, Parainfluenza-3 virus, Bovine viral diarrhea, and Bovine respiratory syncytial virus (Chakanaya et al., 2016; Giovannini et al., 1988; Jensz, 2013; Kowal et al., 2012). Autopsies have also found the following helminths: Fascioloides magna, Fasciola hepatica, Spiculopteragia asymmetrica, Spiculopteragia spiculoptera, S. mathevossiani, Ostertagia drozdzi, Ostertagia arctica and Spiculopteragia quadrispiculata (Ambrosi et al., 1993; Chakanaya et al., 2016; Karamon et al., 2015).

Lifecycle Stages
The maximum recorded longevity of Fallow Deer occurred in captivity, at 21 years but they are thought to live up to 25 years in the wild. The deer show a life-history consisting of four stages: yearling, pre-reproductive, at around two to three years of age, prime age, and senescence, which begins at the onset of maturity around the age of nine years (McElligott et al., 2002). Fawns weigh around 3kg at birth and adult size is reached after four to six years in hinds and five to nine years in bucks. Fawn weaning continues for seven months, rumination begins after two to three weeks, and independence occurs after a year (Jensz, 2013). Before rumination, the fawn lies hidden, and the mother typically visits it several times a day to feed and groom it (Kjellander et al., 2012). Males and females reach sexual maturity at around 16 months, after which females mate once a year, usually giving birth to a single fawn (Chapman & Chapman, 1969; Jensz, 2013). However, males are typically prevented from mating by older males, so males only begin mating at five or six years of age. Males and females live in separate groups for most of the year, until the rutting season. Grouping can vary largely, though, from solitary individuals to groups of up to 30 individuals. Antler development begins during the second year, with single unbranched antlers emerging. These become larger and develop more points every year, until about five or six years of age (Jensz, 2013).

Uses
Fallow Deer are farmed extensively. They are significant contributors to the meat industry in Europe, China, the US, Canada and New Zealand (Chakanaya et al., 2016; Water et al., 2011). Their antlers and velvet are also sought after, contributing to their farming and maintenance in regions were recreational hunting is popular (Jensz, 2013).

Habitat Description
Fallow Deer are a very adaptable Palaearctic species and have survived in a wide range of habitats. These include forests, shrublands, grasslands, pastures, plantations, and agricultural land, with different levels of disturbance (Masseti & Mertzanidou, 2008). They prefer habitats in close proximity to cover ("Hastings WIld Deer", 2016). Their home ranges are small, averaging 0.5 to 1 km2, and depend on multiple factors, including food availability, population density, disturbance and climatic conditions. This range increases by around 50% in the winter (Jensz, 2013). This small range makes it one of the least dispersive species. Dispersal is most likely to occur through males, which have larger ranges than females and don't tend to remain in any particular area (Nugent, 1994). While their global distribution is vast, populations are scattered and patchy within its general range (Masseti & Mertzanidou, 2008).

Reproduction
Fallow Deer are polygynous, seasonal breeders. The rut occurs in April. Males can have varying mating strategies, which form a spectrum of activity but have been divided as: following, where no territorial behaviour is exhibited and bucks follow female groups without attempting to herd them or hold them in a harem, harems, where males herd a female group and deter other males from approaching, dominance groups, where a dominant male in a multi-male mixed sex group mates with most females, stands, the most common strategy, where a buck defends a territory in which it mates with attracted females, temporary stands, and leks, where males gather and each defend small territories (Langbein & Thirgood, 1989; Stenstrom et al., 2000). The typical rutting stand is roughly 0.2ha in size and separated from other stands by at least 100m (Pemberton & Balmford,1987). Males heavily trample and mark stands with urine and scent glands (Alvarez et al., 1990). Defending stands consists of sparring, where bucks use their antlers to push against each other, and of frequent parallel walks (Jennings et al., 2003). The factors affecting which strategy is employed by males are primarily population density, habitat structure and tree cover (Langbein & Thirgood, 1989). Females are polyoestrous, with seven cycles of around 22 days in a breeding season. Gestation is around 230 days, and fawning occurs in summer (Asher, 1985; Jensz, 2013).

Nutrition
Fallow deer are ruminants with a four-chambered stomach that uses bacteria to ferment food. Their diet consists predominantly of grasses, herbs, forbs and sedges. However, they can also browse trees and shrubs, or eat shoots, beech mast, chestnuts, acorns, roots, vegetables, flowers, crops, dry leaves, bark, mosses, fungi and lichens. Their peak grazing activity is at dusk and dawn, although activity varies between locations (Jensz, 2013).

General Impacts
Fallow deer have a wide range of impacts, from environmental to socio-economic, due to the large numbers that they can achieve in their introduced ranges. Fallow deer are often involved in deer-vehicle collisions, which pose a significant threat to human well-being and result in large economic costs. Deer collisions are estimated to cost US$1 billion in damage in Europe, with 74,000 collisions a year. In areas where deer are common, there are concerns that habituation from both the deer and the community will lead to increasing dangerous encounters. This is a big concern during the rutting season, since bucks can become very aggressive (Jensz, 2013; Recarte et al., 1998). They can also lead to damages in agriculture and forestry, by grazing on crops, flowers, and orchard and damaging trees through thrashing and barking. They also damage fencing around these crops. Environmental impacts are largely driven by the competition and changes in vegetation structure that they drive through over-browsing and over-grazing. They browse saplings and alter natural succession. This favours the establishment of weeds and the accumulation of slowly-degrading litter. The altered nutrient fluxes can reverberate through the ecosystem in knock-on effects. Reduced vegetation cover due to deer has also been shown to significantly reduce the biodiversity of birds, as it removes habitats and food (Jensz, 2013). Fallow deer are also a reservoir for a large number of pathogens, including tuberculosis, which is infectious to humans. This poses a risk both to communities and to livestock (Water et al., 2011; Schettler et al., 2006).

Management Info
Fallow deer are hunted in most places, either recreationally, commercially, or as a control strategy. It's managed as a park animal (Masseti & Mertzanidou, 2008). Control methods are usually ground hunting, although aerial hunting is also used. Hunting is enhanced by techniques such as radio-tracking individuals, which act to guide hunters to larger groups. In a few places, sterilization is used to control population sizes. Control programs usually benefit largely from awareness programs in the community, since the shooting of deer is likely to arouse community opposition. Other management includes the inclusion of Fallow Deer in risk assessments concerning the spread of diseases, since they can be carriers for a wide range of pathogens (see the notes section for a non-exhaustive list). Regulations on the transport of deer have been implemented as a means to limit disease spread.

Pathway
Deer introduced to James Island swam to and established a populaiton in Sidney Island.Escaped in the 1990s from farms because of deteriorating fencing.

Principal source: Chapman, N. G., & Chapman, D. I. (1980). The distribution of fallow deer: a worldwide review. Mammal review, 10(2-3), 61-138. Jensz, K. and Finley, L. (2013) Species profile for the Fallow Deer, Dama dama. Latitude 42 Environmental Consultants Pty Ltd. Hobart, Tasmania. Langbein, J., & Thirgood, S. J. (1989). Variation in mating systems of fallow deer (Dama dama) in relation to ecology. Ethology, 83(3), 195-214. Masseti, M. & Mertzanidou, D. 2008. Dama dama. The IUCN Red List of Threatened Species 2008: e.T42188A10656554. Wild Deer (2009). Parliamentary Office of Science and Technology. Postnote.

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[12] UNITED STATES
[1] VIRGIN ISLANDS, BRITISH

Red List assessed species 1: LC = 1;

Capreolus capreolus **LC**

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