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Survey of a leucistic Fallow deer *Dama dama* Linnaeus, 1758 at Macchiagrande WWF Oasis and surrounding areas (Latium, Italy)

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ABSTRACT In this note we report the observation over two years of a leucistic individual of the Fallow deer *Dama dama* Linnaeus, 1758 at Macchiagrande WWF Oasis and surrounding areas (Latium, Italy).

KEY WORDS Leucism; Fallow deer; *Dama dama*; Macchiagrande; Maccarese; Italy.

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INTRODUCTION

The Fallow deer *Dama dama* Linnaeus, 1758 is a ruminant mammal belonging to the family Cervidae. This common species is native to western Eurasia. The male is known as a buck, the female is a doe, and the young a fawn. Adult bucks are 140–160 cm long with a shoulder height of 85–95 cm, and typically 60–100 kg in weight; does are 130–150 cm long with a 75–85 cm shoulder height, and 30–50 kg in weight. The largest bucks may measure 190 cm long and weigh 150 kg. Fawns are born in spring at about 30 cm and weigh around 4.5 kg. The life span is around 12–16 years. Agile and fast in case of danger, fallow deer can run up to a maximum speed of 30 mph (48 km/h) over short distances (being naturally less muscular than other cervids such as roe deer, they are not as fast). Fallow deer can also make jumps up to 1.75 metres high and up to 5 metres in length. The species has great variations in the color of the coat, with four main variants, "common", "menil", melanistic and leucistic, a genuine, non-albinistic chromatic variety. The common and the menil are dark and the melanic is very dark; sometimes even black. Most wild herds consist of the common coat variation, but it is not uncommon to see animals of the menil coat variation. The melanic variation is rarer and the white even much rarer. *Dama dama* is perhaps the cervid whose current distribution has been most influenced and altered by man (Chapman & Chapman, 1975, 1980; Putman, 1988). In fact, its distribution and success as a species has enormously been increased by the activities of man (Masseti et al., 1997).

In Italy, the currently present fallow deer populations in the two Presidential Estates, Castelporziano (Rome) and San Rossore (Pisa), can be considered the oldest established fallow deer strains that still survive within the peninsula (Masseti, 1996). Most of the fallow deer populations scattered

throughout Italy today originated from these two historical strains (Perco, 1987; Focardi & Toso, 1991).

Albinism is a genetic condition caused by an autosomal recessive gene that affects normal pigmentation in humans and animals (Oliveira & Foresti, 1996), and is characterized by the absence of pigment in the eyes, skin, hair, scales, feathers, or cuticles (Grano & Angelici, 2017). These phenomena may be related to environmental factors, such as exposure to heavy metals (Oliveira & Foresti, 1996), heredity (Ueda et al., 2007), or artificial selection of albino individuals in captivity. The total albinism can occur in all vertebrate groups and it is characterized by whitish body and red eyes (Sazima & Pombal, 1986), whereas partial albinism, also known as leucism, is characterized by presence of pigmentation in only some parts of the body, e.g. the eyes, that are not red as in the albins (Lutz, 2001). Albinism in mammals is a known phenomenon (Jones, 1920; Caro, 2005; Grano & Angelici, 2017), but such cases are rare in the wild (Harrison, 1985; Roulin, 2004).

MATERIAL AND METHODS

Study area

The Macchiagrande oasis covers 300 hectares along the Roman coast, between the two inhabited centers of Focene and Fregene, near the Maccarese agricultural estate (Canu & Indelli, 1989) and close to the Leonardo da Vinci intercontinental airport (Fig. 1).

The oasis was taken under management in 1986 by WWF Italia and currently is managed by WWF Oasi Soc. Unipersonale a.r.l.; it is situated within the "Riserva Naturale Statale Litorale Romano" (RNSLR) and belongs to the Site of Importance Community (IT 6030023) of the Natura 2000 network (Di Giuseppe & Grano, 2020).

Despite the strong urban expansion of the Roman area and the major reclamation works carried out in the past centuries, the area has maintained a fair variety of distinctive natural environments essential for the conservation of flora and fauna typical of the ancient Roman coast, such as the coastal dune, the Mediterranean scrub, the holm oak wood, the mixed forest, the wetland behind the dunes. To these environments are added situations of anthropic origin such as the pine forest, uncultivated meadows and a vineyard consisting of wild plants (Maggioni et al., 2015). Proceeding from the coastline towards the interior, the vegetation follows the typical sequence of coastal ecosystems (Di Giuseppe & Grano, 2020). As for the climate, the area is pertinent to the "Thermotype Lower Mesomediterranean" and the rainfall regime is of the "Maritime Type" (Blasi, 1994).

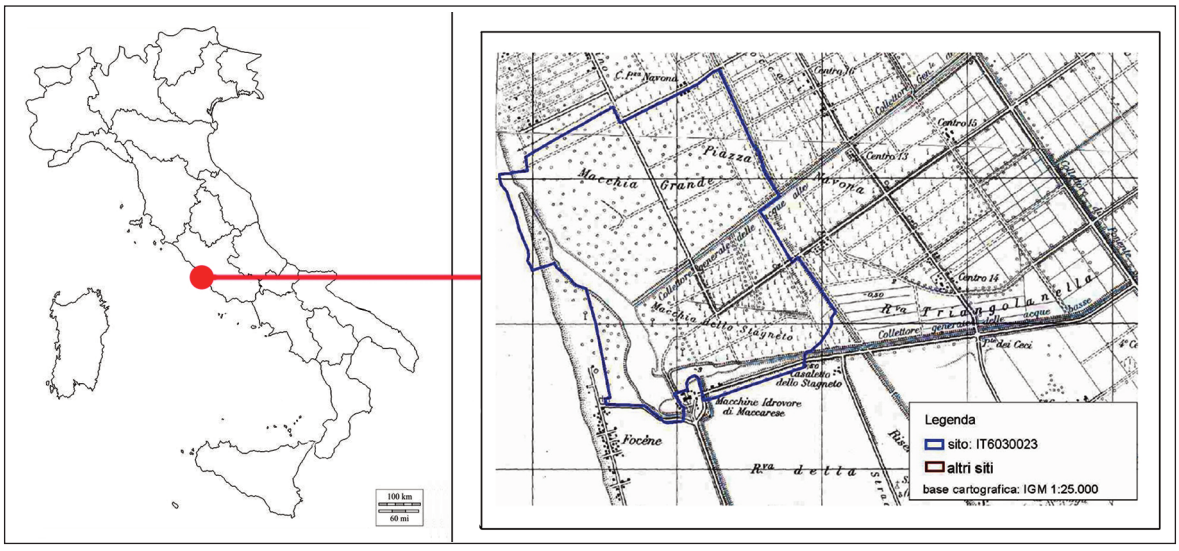

Figure 1. Study area.

Methods

The frequency of Fallow deer in this area has been object of study and monitoring by the authors for few years (Di Giuseppe & Grano, 2020). In May 2020, a leucistic specimen was spotted along the right bank of the Collettore delle Acque Alte, before the pond inside the Macchiagrande oasis (Fig. 2). Further sightings followed over time without the ability of taking pictures. In September 2021, Maccarese near the holm oak in Via dell'Olivetello, at one of the secondary entrances of the oasis, the leucistic specimen was photographed through a camera trap IR-PLUS MINI UV532 installed for monitoring the local fauna (Figs. 3–4).

Figure 2. Leucistic *Dama dama*, courtesy of Roberta Zanella.

RESULTS AND CONCLUSIONS

The European Fallow deer is one of the most widespread cervids, and man has heavily affected its distribution. At present, only one wild autochthonous population is deemed to survive in Anatolia, but its census size is dramatically decreasing. This means that a significant portion of the ancestral genetic diversity of this *taxon* is seriously threatened (Masseti et al., 2008). Species that have been translocated and otherwise handled by humans, such as the fallow deer, can show population structure patterns that reflect these interactions. At the same time, natural processes shape populations, including behavioral characteristics such as dispersion potential and the genetic system (Baker et al., 2017). During the last decade, coat coloration in mammals has been investigated in numerous studies. Most of these studies on the genetics of coat coloration involved domesticated animals. In contrast to their wild ancestors, domesticated species are often characterized by a huge allelic variability of coat-colour-associated genes. This variability results from artificial selection accepting negative pleiotropic effects linked with certain coat-colour variants. Recent studies demonstrate that this selection for coat-colour phenotypes started at the beginning of domestication (Cieslak et al., 2011). It would be interesting to know whether the leucistic fallow deer be disadvantaged or not in regard to predation, and intraspecific interactions, given that predation is one of the most important interactions between species and an important selective pressure in popula-

Figure 3. Leucistic *Dama dama* caught by camera trap.

Figure 4. Leucistic *Dama dama* caught by camera trap.

tions of wild mammals. Camouflage is a common pattern of coloring resulting from the pressure of predation; however, atypical coloring may appear in nature. Both predation and atypical coloring in mammalian species are difficult to observe in a natural environment but contain important biological information. A white coloring is much more evident, and little camouflaged (Venturini Sobroza et al., 2016). Leucism is a partial hypopigmentary congenital disorder that indicates low levels of genetic diversity, mainly occurring in small populations where there is a certain degree of inbreeding. This condition is somewhat detectable in this Fallow deer population, which consists of a small number of specimens. The presence of this leucistic animal in the oasis can certainly arouse interest, especially for the numerous wildlife photographers who frequent the area. However, it could also lead to uncontrolled access to the oasis or even poaching episodes.

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