Conservation experiences, evidence and opinions hosts short operational contributions on bird conservation and management. The contents can include project monitoring, opinions, ideas, and criticisms on any bio-ecological, social, economic, political and historical aspects of bird conservation.

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Italian zoos and birds: May them be a 'missing link' to improve public interest in birds?

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Abstract - Zoos are well-known for conservation efforts benefiting wildlife, including some European bird species such as the Bearded Vulture *Gypaetus barbatus* and Waldrapp Ibis *Geronticus eremiticus*. In Italy there has generally been a lack of scientific interest towards zoos, and ornithology is no exception. Yet, zoo collections not only may present valuable research opportunities, but also may offer valuable insight into psychological mechanisms that make some bird species attractive to visitors while others are practically of zero exhibit value. The lack of specialized bird parks in Italy seems to suggest indirect evidence of the lack of interest in most birds by the general Italian visitor, a fact that in the long-term could have consequences for public attitudes towards bird conservation. Zoos' experiences in species selection for attractiveness may be useful for conservation campaigns, but greater efforts toward neglected taxa should certainly be useful to increase public interest in biodiversity and ecosystem conservation with particular reference to birds.

Keywords: evolutionary psychology, conservation campaigns, conservation breeding, bird park, species attractiveness

Considering the escalating global biodiversity crisis, it has been estimated that about 6% of the extant world avifauna should benefit from conservation breeding programs run by zoos, aviculturists, NGO's and governments (Collar & Butchart 2014). Other than a direct conservation role, zoos working in co-operative national and international networks are today considered as major conservation centres providing a unique contribution to public education, research and environmental awareness (Conway 2003, Gippoliti 2011, Rose 2021). In addition, the bird species for which conservation breeding is recommended mostly belong to non-passerines – zoos tend to hold more large-bodied than small-bodied species – and are species that breed easily in captivity (Collar & Butchart 2014). Indeed, such species are highly threatened by either capture for the bird trade (e.g. parrots) or hunting for food (e.g. pheasants and waterbirds) (Collar & Butchard 2014). Obviously, species such as petrels are excluded from *ex situ* programs because adequate captive management techniques have not been developed yet (Conway 1967).

The so called 'bird parks' ('Parco Ornitologico'

in Italian) are specialised zoos dedicated almost exclusively to birds (Nekolný & Fialová 2018). Examples in Europe include the historical Parc de Cleres founded by Jean Delacour, the famous French ornithologist, and now managed by the Museum National de Histoire Naturelle; the Wildfowl and Wetlands Trust's centre at Slimbridge, founded in 1946 by Sir Peter Scott in the UK; the Vogelpark Avifauna (Alphen) in the Netherlands or the Walsrode Wetvogel Park in Germany (Olney 1979a, Olney 1979b). Although it is a well-known fact that birds rank low among zoo visitors preferred animals (Moss & Esson 2010, Carr 2016), the fact that several bird parks exist in Europe seems to suggest the existence of enough public interest to maintain such specialised zoos economically viable. Italy is one of the few countries in Europe that currently does not have at least one specialized 'bird park' dedicated exclusively or predominantly to the class Aves. More in general, the lack of specialised zoos in Italy seems linked to a poor level request by the public interested mainly to see famous charismatic species such as elephants, dolphins and lions. It seems therefore that, although birds have a dedicated conservation-oriented legislative act within the European Union, the Bird Directive (EEC 2009), interest in birds is not homogeneous among the different European countries.

As a matter of fact, none of the 35 structures that received the Zoo License (DL 73/2005) by the Italian authorities can be described as a bird park, although some specialised zoos such as butterfly houses, delphinaria and faunistic parks dedicated to local species are included. Among non-yet licensed zoos, the exception was the Parco Ornitologico at the Villa d'Orléans in Palermo (Sicily), a site owned and financed by the Sicily Region. The Parco Ornitologico was created in 1953 and managed for several decades by the well-known aviculturist family Lauricella (Lauricella & Scaravelli 2012). After a period of closure, it has been recently reopened, but details about its current mission are unknown. An interesting although not well documented attempt was the creation of an ambitious bird park, Selva di Paliano (Frosinone), undertaken in the 1970's by Count Antonello Ruffo di Calabria based on the Slimbridge model (Mori 2010). The Oasi di Sant'Alessio near Pavia is today probably the closest to a true 'bird park' (but with several mammal species), with notable successes in breeding hummingbirds, birds of paradise and many other bird species rarely found in other zoos such as several of the Italian Charadriformes, often held in impressive naturalistic exhibits (Salamon et al. 2018). A list of Italian bird parks is presented in Tab. 1. In Italy, as elsewhere in Europe, there is a strong interest for breeding birds in private collections that often were at the origin of a bird park project. Private bird collections are not considered in this paper s they are not open to the public. There is also no Italian zoo specialized in the country's terrestrial fauna, except for the plan of the Pescasseroli Zoo inside the Abruzzi National Park, realized in the early '70s, that was aimed to create a true zoo for the fauna of the Apennines. Furthermore, we should add that the national hunting law (DL 157/92) constrains aviculture activities for species belonging to the Italian fauna, especially the hunted ones, with two obvious consequences; 1) many native species are practically unknown to the general public and 2) this further pushed aviculture interest towards non-indigenous species.

Table 1. Historical lists of bird parks in Italy

Institution	Locality	Years of activity	Notes
Parco Ornitologico di Villa d'Orleans	Palermo	1953-2016	Reopened 2021
Selva di Paliano	Frosinone	1974-2000	
Oasi di Sant'Alessio	Pavia	1994-	With many mammal spp.
Parco Ornitologico Martinat	Pinerolo, Torino	1995-2010	
Parco dei Pappagalli	Latisana, Udine	2006-2009	

To my knowledge, the low appeal of birds to the general Italian public has never been discussed by Italian ornithologists and conservationists, yet it is at the root of the lack of attention paid by zoos to birds and may have unknown consequences for conservation. Interestingly, even for several zoo professionals, a zoo with too many bird species – and too few mammal species – is not a zoo at all, or at least it is not worth a visit! Indeed, private bird collections that were then opened to the public (such as the above mentioned Oasi di Sant'Alessio or the Bioparco Gallorose at Cecina near Livorno) needed to be integrated with a lot of mammal species to be valued positively by visitors (Gippoliti pers. obs). Evidently, birds don't sell tickets!

In the past, there was a greater integration between aviculture, researchers, and the zoo world. Renowned Italian ornithologists such as Giacinto Martorelli, Francesco Chigi, Alulah Taibel and foremost Alessandro Ghigi were themselves bird breeders and supporters of zoological gardens (Gippoliti, 2019). As a result, contributions in different fields of research, such as parasitology, ethology and genetics, were more common (Agostinucci & Bronzini 1955, Mainardi & Taibel 1962), as were reports of interesting breeding results (i.e., Bronzini 1943, 1946, Cuneo 1968, Wenner 1978). Rome Zoo was well-known for its collection of Galliformes for most of its history, while Naples Zoo held a famous Psittaciformes collection (Gippoliti 2010, 2016). Currently, only the Parco Natura Viva, near Verona, maintains a considerable scientific interest toward birds (Sandri et al. 2017, Spiezio et al. 2018).

A global study suggests that, although birds are better represented in the zoos than other taxonomic groups, there is still a decline in the average richness of birds per collection since 1960, from an average of 146 species to 48 per zoo (Brereton & Brereton 2020). Populations of birds have probably declined in zoos, owing to several reasons, including a wish to reduce the number of individual species-specific aviaries and a preference for large naturalistic multi-species exhibits (Robovský et al. 2020). In a study of Galliformes in European zoos members of the European Association Zoos and Aquaria (EAZA), it appears that the populations declined by 20% between 1996 and 2006 (Hennache 2009). There is a significant body of literature that confirms that mammals attract more interest by zoo visitors and that interest in birds is, generally, minimal (Moss & Esson 2010). Notable exceptions include a few species such as flamingos, penguins, peafowls and ratites. For example, it was estimated in 2010 that *Phoenicopterus* sp. were present in two thirds of EAZA zoos, for a total of about 8,400 individuals (King & Brako 2014).

Domination by large-sized mammals in zoos may reduce the number of conservation issues that are covered by education departments. Poaching is a general theme valid with several mammal species (elephants, rhinoceros, large cats, etc.). But a focus that is less 'mammal-centric' and rightly values bird diversity may allow for a wider range of conservation issues (conservation threats; Salafsky et al. 2008) to be highlighted such as the importance of specific habitats, consequences of roads and ski slopes, introduction of invasive species (including feral cats and dogs), especially in island ecosystems, loss of large birds from electrocution and wind farms, deforestation and disturbance during nesting season, over-collecting for the pet trade and so on. It should be noted that even if dealing with exotic species, these kinds of threats are certainly more pertinent to the environmental issues we face in Italy too and may easily linked to global threats as climate change (Clayton et al. 2014).

The study of zoo collections is also providing interesting information about psychological mechanisms underlying human preferences towards living organisms (Lišková et al. 2015). It has been found that attractive parrots are more commonly held in zoo collections (Frynta et al. 2009). The steady decline of space available for birds in zoos increases the competition for the remaining space and creates a general reduction in available resources for birds in general.

Understanding what people like about birds can help target advocacy for bird conservation. For example, in Australia, when people were asked which five birds they found most attractive, 48% named no more than three, mostly large, well-known species. Images displayed by a leading Australian bird conservation organization also favoured large colourful species (Garnett et al., 2018). Therefore, the available evidence suggests that conservation advocates can promote as flagships a much wider range of bird taxa than the few – penguins etc. – already noted previously, particularly smaller species that might otherwise be neglected. Zoos may play a critical role through more accurate collection planning that assures a greater representation of bird diversity. For example, zoos should allow a greater appreciation for small-sized species of shorebirds that, appropriately exhibited in typical habitats, can be observed easily also by children and without binoculars, possibly increasing conservation concern for these species and providing experience for nature-disconnected generations (see also the concept of 'Experiential key species'; Battisti, 2016). If native species are selected, the zoo may serve as a link with local reserves that are often ignored by local communities and tourists alike. In the long-term, a stable cooperation may be built with local NGO's and protected areas so that conservation messages reach a wider audience. On the other hand, the national research community should progress in establishing a closer relationship with zoos that represent unique settings where biological, cognitive, social and conservation issues may integrate. A greater focus on birds should certainly have beneficial aspects inside and outside zoos.

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