



An example of integrated ornithological collections between the Museo Civico di Storia Naturale di Carmagnola and the Dipartimento di Scienze della Terra of the Torino University, Italy

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Abstract. In Italy, almost 35 museums are known holding major bird collections, mainly consisting of mounted specimens and secondly of study skins. Most of the specimens date back to the middle of the 20th century, because the collections are not increasing except of a few specimens for exhibition purposes. Among the few exceptions are the modern-type growing bird collections stored in the Museo Civico di Storia Naturale of Carmagnola (Torino), and in the Dipartimento di Scienze della Terra of the University of Torino, Italy, which now benefit from the recently developed joint program for increasing and managing the collections, to maximize the data derivable from single specimens and increase their use for the scientific community.

Key words. Italy, bird collections, increasing policies

INTRODUCTION

The Roselaar's (2003) inventory of European major bird collections lists 35 museums for Italy (9 in the list "A" i.e. with more than 4000 skins, and 26 in the list "B", i.e. with fewer than 4000 skins). According to Violani & Barbagli (2003) there are in Italy at least five museums with over 15000 bird specimens, each with specimens from all parts of the world and with rather many avian type specimens (e.g. the Genova museum holds about 250 types, Torino has more than 200, Milano about 100). Moreover, there are about twenty museums of medium importance, which possess collections of some thousands specimens. Violani & Barbagli (2003) complain that the material is dispersed in so many institutions, due to the lack of a national museum in Italy. However, most of the ornithological material collected within Italy dates back to the middle of the 20th century, with possibly main exceptions of Milano museum with a growing collection of Italian material up to the 'eighty' thank to the late Edgardo Moltoni, and the INFS (now ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale) collection held in Ozzano dell'Emilia (BO).

Unfortunately, no complete survey of Italian bird collections is available up to now, while such surveys are available for mammals (De Marinis et al. 2007) and herpetology (Mazzotti & Miserocchi, 2009).

In general, mounted specimens prevail in Italian museum bird collections, while skins are well represented only in larger collections. A preliminary survey (Pavia & Boano unpub.) recorded some 170,000 mount and skins kept in 50 institutions, but other material (especially skeletons, tissue samples and spread wings) was found too scanty, totally inadequate for modern scientific research.

In the Piemonte Region (NW Italy), there are about a dozen public bird collections (Pavia & Boano unpub.). They are mostly constituted by hundreds (rarely thousands) of mounted specimens, the exception being the historical collection of the Museo di Zoologia of the University of Torino, managed from 1980 in the Museo Regionale di Storia Naturale (Torino), which now holds about 23.000 specimens (including more than 15,000 study skins) of great historic and scientific value. In particular, it has more than 200 type specimens, mainly described by the greatest Italian ornithologist Tommaso Salvadori (1835-1923). Despite this important ornithological tradition, this main regional Museum has no increasing policy, active or passive, of ornithological materials. The same is true for almost all others museums and collections, except for a few specimens prepared only for exhibit purposes.

We are presenting here ~~the~~ two Italian ornithological collections with a modern-type growth based on scientific projects, which also benefit from a joint program between the two scientific institutions hosting the collections, the Museo civico di Storia Naturale di Carmagnola, Torino (MCCI) and the Dipartimento di Scienze della Terra of the Torino University (MGPT-MPOC). The specimens in both collections come from wild bird recovery centers, dead birds of various origins (hunted, road-killed, salvaged birds, etc.), collecting missions, exchanges with other institutions, mainly those outside of Italy. Even birds from zoos and from others captive origins are taken into account, as captivity normally does not affect the size and morphology of bones and plumage. Moreover, in this way it is possible to add some very rare species.

THE CARMAGNOLA ORNITHOLOGICAL COLLECTION

In the regional context described above, starting from 1970, the Museo Civico di Storia Naturale di Carmagnola (MCCI) has created and non-stop implemented a scientific bird collection, which now (end of 2013) counts 5451 specimens (735 taxa) of 23 orders and 95 families (Table 1). The collection includes mounted birds (522 specimens; 300 species); skins (1267 specimens; 459 species); eggs and nests (292 specimens; 155 species); wings and feathers (1740 specimens; 386 species); partial or complete skeleton (496 specimens; 227 species); spirit specimens, including ethanol tissue samples (1052 specimens; 418 species), and partial or complete birds (53 specimens, 36 species). As many specimens are preserved as study skins, osteological parts and tissue samples, sometimes also with a stretched wing (Fig. 1), the number of specimens and species for each category is not additive and all specimens coming from the same individual (e.g.: skin, spread wing, alcohol tissue sample) have the same catalogue number.

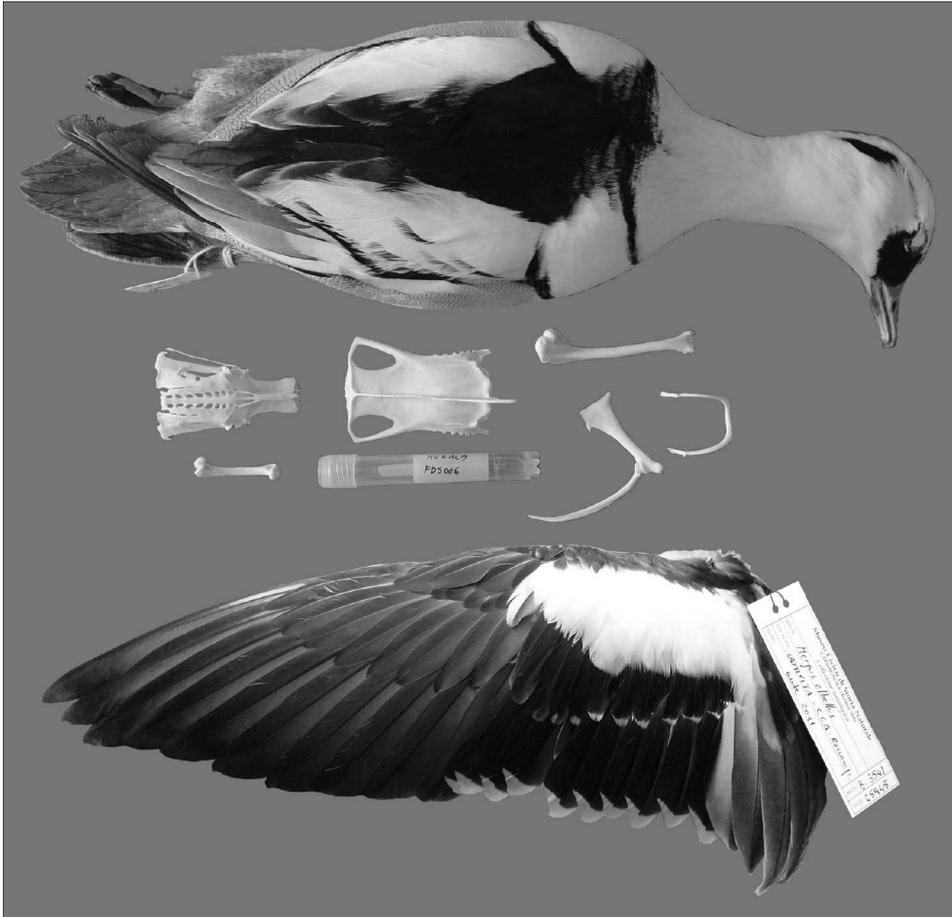


Fig. 1. Specimen of *Mergellus albellus* (MCCI 3541) from captivity, preserved as a study skin, left stretched wing, some skeletal elements and tissue sample.

Main scope of this collection is to document the birds of NW Italy and the Mediterranean, but some recent expeditions to Western Africa expanded the geographical provenience of the specimens. Overall, 65% of specimens came from Italy, mainly its northwestern part, while 14% are Afrotropical (mainly from Western Africa), 4% Neotropical (mainly from Peru), and others came from European countries and aviaries.

THE TORINO ORNITHOLOGICAL COLLECTION

In 1999, the Dipartimento di Scienze della Terra of the Torino University started the constitution of a bird skeleton collection (called Marco Pavia Ornithological Collection MPOC) to use as reference collection for the studies on fossil birds and bird skeletal anatomy. This collection is now part of the collection of the Museo di Geologia e Paleontologia of the Torino University with the acronym MGPT-MPOC.



Fig. 2. Specimen of *Lanius meridionalis uncinatus* from the Socotra Island, Yemen, preserved as a complete skeleton (MGPT-MPOC 422), left stretched wing and tissue sample (MCCI 2964).

Up to now (end of 2013), the MGPT-MPOC collection comprises 944 complete or partial skeletons from 418 species of 22 orders and 94 families (Table 1). The first aim of the collection was to have a best representative of Western Palaeartic species, as it is primarily used as reference for European Pleistocene fossil bird remains. Following the development of the paleornithological researches, with studies on older forms and African birds (e.g. Bedetti & Pavia 2013, Pavia & Mourer-Chauviré 2011), our new purpose is to broaden the collection in order to have at least one specimen from each bird family

of the World, and more than one species for particular groups that can be related to the Old World. In fact, the ancestors or the closest relatives of some European Pliocene and Neogene species are now living in Africa or other continents, so a well differentiated collection is needed as a starting point for these paleontological studies.

All the specimens are preserved, as disarticulated skeletons, in cardboard boxes stored in a temperature-controlled room with metal drawers. An index collection with the major long bones and other diagnostic elements taken from selected specimens is prepared to prevent damages in smaller bones produced by the frequent searching of the long bones for easy comparisons. The collection is completely computerized and we plan to publish the catalogue on the web very soon.

THE COLLABORATION PROJECT

Ten years ago the MCCI and MGPT-MPOC collections started a joint program in order to have modern-type collections with a common increasing policy in terms of priority (each specimen prepared following the needs of each collection) and every specimen valorised as most as possible with different preparation techniques and/or data collected. In particular, from some specimens prepared as complete skeleton (stored in MGPT-MPOC) we preserve a stretched wing and some feathers and/or a tissue sample, always preserved at MCCI (Fig. 2), while some specimens of uncommon to rare species were prepared as a round skin/skeleton combination (following Drovetski 2007). As a result of this joint program our institutions have a growing modern-type bird collection (possibly the only one in Italy except ISPRA, Ozzano, BO). Many people, also from foreign institutions, have begun to use these collections for their researches in morphology, systematics, genetics, ecology, and palaeontology (cf. Brito 2005, Pons et al. 2011, Mayr & Pavia in press, Drovetski et al. 2013, Rook et al. 2013, Mayr & Pavia 2014), including students for Master and PhD theses.

In spite that we acknowledge the problems posed by an overdispersion of Italian ornithological collections (Violani & Barbagli 2003), in full agreement with Winker & Withrow (2013), we emphasize that even small and recent collections can make substantial contributions to the ornithology (and natural history in general), especially at a time in which natural history collections receive very few support and collecting activity is more and more difficult, if efficiently managed and available to researchers. For a support of this statement see the web page of the Carmagnola Museum with a bibliography of scientific papers based in part on specimens from this collection (<http://www.storianaturale.org/carmagnola/eng/publications/publications-about-museum-specimens/>).

ACKNOWLEDGMENTS

We are indebted to all people and institutions that helped to increase our collections by salvaging, collecting and donating birds. Among the others it is worth mentioning many members of Gruppo Piemontese Studi Ornitologici (GPSO), various Italian wildlife recovery centres including the CRAS of Asti, Bernezzo (CN), Ficuzza (PA), Livorno, Policoro (MT), Racconigi (CN); the natural history museums of Bra (CN), Ferrara, Len-

tate sul Seveso (MB), Livorno, Pordenone, and Stazzano (AL); ISPRA; the natural parks of Alpi Marittime (CN), Lago Salso (FG); the Province of Torino and Alessandria. Specimens were also obtained with exchanges with foreign museums: American Museum of Natural History (New York, USA), Canterbury Museum (Christchurch, New Zealand), Naturalis Biodiversity Center (Leiden, The Netherlands), Senckenberg Naturmuseum (Frankfurt am Main, Germany), Museu de Historia Natural de Taubaté (São Paulo, Brazil). L. Cristiano, M. Cozzo, G. Gertosio, F. Morganti, F. Spaziani, and G. Vaschetti helped in preparing specimens.

REFERENCES

- Bedetti C. & Pavia M., 2013: Early Pleistocene birds from Pirro Nord (Puglia, southern Italy). – *Palaeontographica (A)* 298: 31-53.
- Brito P.H., 2005: The influence of Pleistocene glacial refugia on tawny owl genetic diversity and phylogeography in western Europe. – *Molecular Ecology* 14: 3077-3094.
- De Marinis A.M., Cagnin M. & Cagnolaro L., 2007: A survey of recent mammal collections in Italy. – *Hystrix (n.s.)* 18: 137-156
- Drovetski S., 2007: Preparation of avian specimen for research collections. – <http://ornithology.uaa.alaska.edu/Documents/Prep%20manual.pdf>.
- Drovetski S.V., Semenov G., Drovetskaya S.S., Fadeev I.V., Red'kin Y.A. & Voelker G., 2013: Geographic mode of speciation in a mountain specialist avian family endemic to the Palearctic. – *Ecology & Evolution* 3: 1518-1528.
- Mayr G. & Pavia M., 2014: On the true affinities of *Chenornis graculoides* Portis, 1884, and *Anas lignitifila* Portis, 1884 – an albatross and an unusual duck from the Miocene of Italy. – *Journal of Vertebrate Paleontology* 34: 914-923.
- Mazzotti S. & Miserocchi D., 2009: Le collezioni erpetologiche dei Musei Italiani. Censimento e analisi preliminari della rappresentatività tassonomica e geografica [Herpetological collections of Italian museums. An overview and preliminary analyses of taxonomic and geographic representation]. – In: *Atti Convegno ANMS Verona 2007*. – *Museologia Scientifica, Memorie* 4: 143-148. [In Italian.]
- Pavia M. & Bedetti C. 2013: The presence of Harlequin duck *Histrionicus histrionicus* (Linnaeus 1758) in the Middle Pleistocene of Italy. – *Journal of Ornithology* 154: 875-878.
- Pavia M. & Mourer-Chauviré C., 2011: Redescription of *Tyto sanctialbani* Lydekker, 1893 (Aves, Strigiformes), from its type locality of La Grive-Saint-Alban (middle Miocene, France). – *Journal of Vertebrate Paleontology* 31: 1093-1101.
- Pons J.-M., Olios G., Cruaud C. & Fuchs J., 2011: Phylogeography of the Eurasian green woodpecker (*Picus viridis*). – *Journal of Biogeography* 38: 311-325.
- Rook L., Ghinassi M., Carnevale G., Delfino M., Pavia M., Bondioli L., Candilio F., Coppa A., Martínez-Navarro B., Medin T., Papini, M., Zanolli C. & Libsekal Y., 2013: Stratigraphic context and paleoenvironmental significance of minor taxa (Pisces, Reptilia, Aves, Rodentia) from the late Early Pleistocene paleoanthropological site of Buia (Eritrea). – *Journal of Human Evolution* 64: 83-92.
- Roselaar C.S., 2003: An inventory of major European bird collections. – In: Collar N.J., Fisher C.T. & Feare C.J. (eds.): *Why museum matter: avian archives in an age of extinction*. – *Bulletin of the British Ornithologists' Club* 123A: 253-337.
- Violani C.G. & Barbagli F., 2003: The international importance of bird collections in Italian museums. – *Bulletin of the British Ornithologists' Club* 123: 143-152.
- Winker K. & Withrow J.J., 2013: Small collections make a big impact. – *Nature* 493: 480.

Tab. 1. List of specimens preserved in the Museo Civico di Storia Naturale of Carmagnola (MCCI) and in the Marco Pavia Osteological Collection of the Museo di Geologia e Paleontologia of the Torino University (MGPT-MPOC).

Families	MCCI							MGPT-MPOC
	Mount	Skin	Egg+nest	Feather	Skel	Tissue	Spirit	Skel
Struthionidae			1					
Dromaiidae			1					
Tinamidae	2			1	2			4
Anatidae	51	19	19	72	94	5		89
Cracidae								1
Phasianidae	57	20	30	92	32	17		19
Gaviidae	3	1			4	1		6
Podicipedidae	9	9	8	6	6	7		11
Phoenicopteridae				3	2			4
Spheniscidae								3
Procellariidae	2		1	3	2	1		18
Hydrobatidae					1	1		3
Sulidae								6
Pelecanidae					1			1
Phalacrocoracidae	6	1		2	6			10
Anhingidae								1
Fregatidae								1
Ardeidae	20	22	19	33	25	12	3	46
Threskiornithidae	4			3	4			6
Scopidae				1		1		1
Ciconiidae	2		3	6	5			4
Cathartidae								2
Pandionidae	3							4
Accipitridae	27	60	2	126	55	43	2	67
Falconidae	17	32	5	43	21	17		40
Turnicidae								1
Rallidae	19	23	5	31	14	18		17
Otididae	1			2	1			
Gruidae	1	1		4				4
Burhinidae	2			2				2
Charadriidae	11	5	11	14	2	5		24
Haematopodidae		1	2	4		2		5
Recurvirostridae	1	1	6	1	3	3		12
Jacaniidae	1	5		4		9		5
Scolopacidae	33	16	8	75	25	8	2	71

Glareolidae					1			1
Rostratulidae		8		5	1	9		3
Laridae	13	11	12	35	10	12		55
Stercorariidae	1	1		2	1	1		1
Alcidae				2	1	3		21
Pteroclididae	2	2		3	4			2
Columbidae	4	12	9	66	22	11	6	17
Cacatuidae				1				
Psittacidae	3	2		2	5			14
Musophagidae		2		4		5		2
Cuculidae	5	8		23	1	7		8
Tytonidae	7	14	1	16	4	7		9
Strigidae	43	60	16	130	31	49	1	45
Caprimulgidae	2	9	1	21	1	15	1	6
Nyctibiidae								1
Apodidae	5	36	12	21	15	18	6	19
Trochilidae	1	16		1	1	6	1	
Coliidae		1						
Alcedinidae	5	23	1	14	2	32	6	12
Meropidae	2	12	1	5	1	11	4	7
Coraciidae	1	6		7		14		4
Upupidae	1	4		9	2	4		8
Phoeniculidae		4		2		6		1
Bucerotidae		2		2		4		3
Lybiidae								2
Capitonidae		2		1		5		
Ramphastidae	1				1			3
Indicatoridae		5		4		5		1
Picidae	10	32	1	64	11	26		22
Dendrocolaptidae		9			1	12	1	
Furnariidae		3				5	2	1
Thamnophilidae								1
Formicariidae		11			1	32		
Tyrannidae		6		2		12		6
Pipridae		2				2		2
Laniidae	8	19	5	20		18	2	9
Campephagidae		1		1		2		2
Corvidae	18	30	11	61	22	19		27
Monarchidae		12		2		8		
Alaudidae	6	9	2	10		4	2	6

Hirundinidae	3	13	5	18	4	6		3
Paridae	4	14	11	52	1	8	5	5
Remizidae	1			2				
Aegithalidae		8	1	5		7		1
Sittidae	1	6		7	2	2	1	2
Certhiidae	3	3		5	1	2	1	
Troglodytidae	1	1	2	12	2	1		1
Cinclidae	1	1		1				4
Pycnonotidae		21		7		27		1
Sylviidae	11	145	13	108	6	119	12	23
Muscicapidae	2	22	2	23		19		15
Turdidae	27	94	20	150	15	78	6	14
Platysteiridae		14		5		15		1
Timaliidae		7		3		9		1
Zosteropidae		2		1		3		1
Panuridae	1							
Nectariniidae		29		2	2	31	1	2
Oriolidae	2	5		4	3	5		7
Dicruridae		3		2		4		1
Mimidae								1
Sturnidae	2	22	5	22	1	16	1	5
Prunellidae	2	5	1	10	1	7	2	3
Motacillidae	7	27	5	36	1	20		8
Bombycillidae	2	5		3		5		1
Parulidae		1				1		1
Emberizidae	17	45	3	43	4	27	5	6
Icteridae		2				1		
Fringillidae	18	73	15	118	6	39	1	21
Ploceidae	7	82	16	35	2	60	7	6
Estrildidae		27		2	1	26	1	1
Sum	522	1267	292	1740	496	1052	52	944

