

TOMMASO LA MANTIA, IVAN BUSCEMI, TONI MINGOZZI & BRUNO MASSA

DATA ANALYSIS ON EXTINCT AND LIVING WOODPECKERS
(*Aves Picidae*) IN SICILY AND CALABRIA (SOUTHERN ITALY)

SUMMARY

Some species of animals related to forest habitats have disappeared or greatly decreased in the first half of the last century. However, during the second half of the last century the forest areas have increased and many forests have been protected. This produced conditions for a re-colonization or reintroduction of extinct forest animal species. The present study is a complete overview of records of extinct and still living Black Woodpecker *Dryocopus martius*, European green Woodpecker *Picus viridis*, Middle spotted Woodpecker *Dendrocopos medius* and Lesser spotted Woodpecker *Dendrocopos minor* in Sicily and Calabria (Southern Italy). This study was carried out to show that these woodpeckers, or at least some of them, may have existed in Sicily and are possible candidate for reintroduction projects in the island. This explains the reasons of a historical and contemporary survey on the presence of the above mentioned species in Calabria, that could be the place where these birds could be recovered for possible reintroduction projects in Sicily.

Key words: *Dryocopus martius*, *Picus viridis*, *Dendrocopos medius*, *Dendrocopos minor*, *Dendrocopos major*, historical records

RIASSUNTO

Rassegna dei dati riguardanti i picchi (Aves Picidae) viventi ed estinti in Sicilia e Calabria (Italia meridionale). Alcune specie di animali legati agli habitat forestali sono scomparsi o fortemente diminuiti in Sicilia sino alla prima metà del secolo scorso. Dalla seconda metà del secolo scorso, le aree forestali nell'isola sono aumentate e, in aggiunta, molti boschi sono stati protetti e utilizzati in modo più sostenibile. Ciò ha creato le condizioni per la ricolonizzazione o la reintroduzione di specie animali legate agli ambienti forestali. Questo studio costituisce una riesamina dei dati storici e attuali sulla presenza di Picchio nero *Dryocopus martius*, Picchio verde *Picus viridis*, Picchio rosso mezzano *Dendrocopos medius* e Picchio rosso minore *Dendrocopos minor* in Sicilia e in Calabria (Italia

meridionale). Lo studio è stato effettuato per comprendere se realmente queste specie fossero presenti in Sicilia e per quali di queste si possa ipotizzare una loro reintroduzione. L'analisi bibliografica della presenza in Calabria si giustifica nel fatto che la regione potrebbe rappresentare l'area di potenziale prelievo di individui destinati a un eventuale progetto di reintroduzione in Sicilia.

Parole chiave: Picchio nero, Picchio verde, Picchio rosso mezzano, Picchio rosso minore, Picchio rosso maggiore, distribuzione storica, Italia meridionale.

INTRODUCTION

According to a forest inventory, in Italy the forested areas have grown from 8,675,100 hectares in 1985 to nearly 10,470,000 hectares in 2011 (DE NATALE & GASPARINI, 2011). This growth has involved all Italian regions, especially Sicily, where the forest area, increased from 266,400 ha in 1985 to 512,121 in 2009 (HOFFMANN, 2011). This afforestation process followed the great deforestation occurred during the last century, which peaked during World War II. Forest reduction and fragmentation led to a decrease in number of birds and even to the loss of some endemic species (MASSA & LA MANTIA, 2007).

As a result of the recent forest expansion, the population of many species, which depended on forest ecosystems, such as birds, increased once again, as demonstrated by the ever-growing birds population all over Italy (RETE RURALE NAZIONALE & LIPU, 2011; CAMPEDELLI *et al.*, 2012) and in Sicily (LA MANTIA *et al.*, 2014a, 2014b). The present study includes a complete overview on reports of Picidae in Sicily and Calabria, namely: Black Woodpecker *Dryocopus martius*, European green Woodpecker *Picus viridis*, Middle spotted Woodpecker *Dendrocopos medius* and Lesser spotted Woodpecker *Dendrocopos minor*. The Great spotted Woodpecker has been excluded from this research because it is still present and widespread in Sicily and Italy.

The aim of this study is to show that some species of woodpeckers may have existed in Sicily and may be reintroduced on the island, whenever the causes that led to their extinction will be eradicated. For this reason a historical and contemporary research on the presence of them in Calabria, has been conducted. Calabria, indeed, is the place where these birds could be recovered for possible reintroduction projects in Sicily.

MATERIALS AND METHODS

A detailed bibliographical research on woodpeckers in Sicily and Calabria has been carried out on scientific journals, national and local books. In inverted commas the sentences translated from Italian or French. Addition-

ally, we examined all the specimens present in the following museums and collections: Museo Regionale of Terrasini (Palermo) (Orlando coll.), Museo Civico di Scienze Naturali of Randazzo (Catania) (Priolo coll.), A. Rizza Coll. at Liceo Classico T. Gargallo of Siracusa.

RESULTS

Sicily

The earliest reference on the presence of woodpeckers in Sicily, dates back to CUPANI (1713), who illustrated a Lesser spotted Woodpecker, whose identification was confirmed by BENOIT (1840) and RIGGIO (1892). PRIOLO (1996) wrote about it: “To paint the illustration the painter must have had the specimen in front of him, there is no doubt about it”; and MASSA (2009): “Cupani’s illustration [...] witnesses the presence of this species in Sicily during the past. Probably that specimen was extinct by 1900, and this is most likely due to a reduction of woodland areas”.

GALVAGNI (1837-1839), in his fauna of Etna reported the presence of three species of woodpeckers, namely the Great spotted, the Middle spotted and the Lesser spotted Woodpecker. It is of utmost importance to highlight that among dialectal names of woodpeckers listed by LA MANTIA & MASSA (2008) there is not the Middle spotted Woodpecker, whose dialectal name has been mentioned only by GALVAGNI (1837-1839). Further, POWER (1839) in his Ornithological Sicilian Catalogue containing vernacular names from Messina, Palermo, Catania and Enna listed the following species of woodpeckers: *Picus martius*, *Picus viridis* and *Picus minor* (without the dialectal name) and *Picus major* (with dialectal name). Additionally, the Author listed the species of stuffed birds preserved in the Benoit collection, mentioning the Black Woodpecker (see also TRISCHITTA, 1919).

With regards to the Lesser spotted Woodpecker, BENOIT (1840) wrote “This little woodpecker lives in the same places of the Great spotted Woodpecker, it has the same habits though it is rarer”, while about the Black Woodpecker he reported “It is extremely rare in the proximity of Messina. Nevertheless, as two or three specimens have been killed, and in different times, I assume they populate woodlands in the core of the island, owing to the fact that they are sedentary”. Moreover, he wrote about the European green Woodpecker “He lives in woods as its congeners; it is common in Sicilian woods, whereas it is rare in the forests of Messina. It nests inside holes in trees, the female lies six to eight white eggs” (BENOIT, 1840). Later on, POWER (1842) reports the vernacular names for all three species of woodpeckers but

clearly borrowed from Benoit and therefore they are not completely reliable (a critical evaluation of the work of Benoit, also in relation to the work of Power, is reported in LA MANTIA, 2008 and LA MANTIA & MASSA, 2012).

MALHERBE (1842-43), who is considered to have plagiarized Benoit's work (see LA MANTIA & MASSA, 2012), wrote about the Black Woodpecker "It is possible to find it throughout the year in Sicilian forests, mainly in the hinterland ones" and on the European green Woodpecker "This woodpecker populates every forest of the Sicilian hinterland. It is quite rare in woodlands nearby coastal areas, mainly in the surroundings of Messina". He mentioned, as well, the Middle spotted Woodpecker: "is uncommon in Sicily and has always been there probably confused with the Great spotted Woodpecker". Concerning the Lesser spotted Woodpecker he wrote "This little woodpecker is less common in Sicily than the Great spotted Woodpecker, nevertheless it lives in many areas of Europe, in every forest of the Island and in Algeria, as well". We should reconsider Malherbe's work as to the fact that he actually went to Sicily, although for a fleeting visit. Indeed, he wrote (MALHERBE, 1842-43) "I would never let this occasion pass me by without leaving a thank to Carmelo and Joseph Gemmellaro, C. Maravigna, Francesco Cacciola of Catania and Luigi Benoit of Messina, for giving me the honor of carrying out my work while staying in Catania and Messina". It is useful to point out that Malherbe was an expert on woodpeckers, since he described new species (MALHERBE, 1843, 1845, 1849 [1847], 1850, 1852, 1854, 1857) and composed a four-volume essay on Picidae (MALHERBE, 1861-62).

MINÀ PALUMBO (1853) in his inventory of the birds in the Madonie wrote about the Great spotted Woodpecker alone, and only subsequently he mentioned the Middle spotted Woodpecker (MINÀ PALUMBO, 1856-57). Nevertheless, as explained by MASSA & SARÀ (2011) the reason that led Minà Palumbo to report the presence of this species in the Madonie area, was easily clarified through the analysis of his iconography, that revealed the similarity between the young specimens of Great spotted and Middle spotted Woodpeckers.

BIRBECK (1854) wrote about the Black Woodpecker "Very rare in Sicily. Quite common at Naples..."; he also described, in general terms, the Middle spotted Woodpecker, thus it is not clear whether he wanted to describe its presence in Italy and/or Sicily writing "Not uncommon".

DODERLEIN (1869-74) reported about Black Woodpeckers on the basis of what was previously recorded by BENOIT (1840), whereas he stated about the European green Woodpecker "This bird is extremely rare in Sicily, mainly with regards to the proximity of Messina, Agrigento, Palermo; as a consequence many hunters are not even aware of its existence. Some specimens live and nest in big woodlands in the mainland, where some specimens were captured and preserved in cabinets of Siracusa, Catania and Palermo". With

regards to Middle spotted Woodpecker he commented on what had been reported by Minà, cited above, though in his handwritten notes (DODERLEIN, ca. 1890) he affirmed that specimens captured in Sicily were actually juvenile Great spotted Woodpeckers. About the Lesser spotted Woodpecker he wrote "In Sicily, it lives in the same areas where Great spotted Woodpeckers live, of which is by far less common. I could hardly find some specimens in inland areas. Besides I saw a few stuffed specimens exhibited in museums of Catania and Siracusa". Doderlein's main work was firstly published in 1869, when he wrote about woodpeckers, and finished in 1874. While finishing his work, SALVADORI (1872), who did not provide original information about Lesser spotted Woodpeckers and European green Woodpeckers, claimed about the Black Woodpecker "It is believed to live in Sicily... nevertheless, I cannot hide the fact that Doderlein has not found it yet, and I want to highlight this fact because the existence of Black Woodpeckers in Sicily is quite unlikely, in my mind" (he quotes Benoit and Malherbe). This seems to "oblige" Doderlein to write in his reviews of the *Avifauna* of 1873 "Salvadori doubts its presence in the Sicilian bird life... but it actually exists in Sicily, however rare. To uphold this I could mention the proofs supported by Benoit, Martorana and other mountain hunters who report its presence within the central mountains of the Region. Indeed, Mr. Michele Auteri of Catania, a well-known possessor of an astonishing rare bird collection, claims that, among others, he witnessed a specimen being killed in the woodlands of Etna, particularly in the woodland named Zafferana, and consequently he kept that specimen in his collection". He analyzed, as well, the similarity between Middle spotted and Great spotted Woodpeckers and he concluded by saying "Whereas its existence in Sicily still remains an open question".

However, in 1872 Doderlein had clearly stated that "Two or three woodpecker species, the Great Spotted Woodpecker ... the Lesser Spotted Woodpecker ... frequently nest in the woodland regions of the island". He added to the list of woodpeckers the Middle spotted Woodpecker which he considered "Missing among the species that have not been monitored recently, due to the fact they were considered as existing as a consequence of imperfect observations" while he counted the Black Woodpecker and the European green Woodpecker among "Rare birds or birds of passage, at times, coming to Sicily from the north". The same information is found in Doderlein's work of 1881.

GIGLIOLI (1881) in his first work about Italian birds stated that the Lesser spotted Woodpecker was "present throughout Italy, anywhere abundant"; on the Black Woodpecker he added "I am aware that its presence is limited to the Alps" and he quoted Benoit and Doderlein with regard to the specimen of Auteri collection. Furthermore, he considered the European green Woodpecker as "Rare in our islands, it seems do not exist in Sardinia". Concerning

the Black Woodpecker of the Auteri collection, later GIGLIOLI (1886), quoting Benoit and Doderlein, further remarked “I personally went to visit that collection in 1881, and I did not see a trace of that woodpecker. Besides, when I asked Baron Auteri about that particular specimen, he did not remember the case”. In addition, as to the Middle spotted Woodpecker he reported that “for many, the presence of the species in Sicily is still unlikely, as it had been confused with juvenile Great spotted Woodpeckers. Nevertheless I listed their vernacular names following Doderlein. Furthermore, in 1883 I examined a Middle spotted Woodpecker specimen from the Rizza collection in Siracusa, which is said to have been captured in the proximity of that area; I also found one in the Museum of Palermo”. He also mentioned the European green Woodpecker stating that “They are rare in Sicily” and in his appendix he added another dialectal name, used in Palermo. Actually, the Rizza collection contains a pair of European green Woodpeckers and one Middle spotted Woodpecker (without collecting data), and a Lesser spotted Woodpecker from Sicily (CORSO & IENTILE, 1994).

GIGLIOLI (1889) recorded both Black and European green Woodpeckers as uncommon in the province of Messina (source: Ruggeri and Pistone) and the Lesser spotted Woodpecker as extremely rare in the province of Messina (source: Pistone), infrequent in mountains, and sedentary in the Madonie area (source: Palumbo and Morici).

Furthermore, GIGLIOLI, in his “Inquiry” (1890) quoted his collaborators from the province of Messina (Pistone and Ruggeri), who reported the presence of Black Woodpeckers as infrequent, of Great spotted Woodpeckers as “Very scarce” and of Lesser spotted Woodpecker as “Rare but sedentary”. Only Pistone (in GIGLIOLI, 1890) considered the Middle spotted Woodpecker to be “Extremely rare” and the European green Woodpecker as “Common in mountains”. In a note, GIGLIOLI pointed out the fact that Pistone had an extremely beautiful collection of the birds of the area. Other collaborators of Giglioli did not remark the presence of woodpeckers within their areas (whereas they registered their presence in coastal areas or in inland cereal zones). Minà Palumbo and Morici Minà, who were in charge of reporting data from the Madonie area, recorded the presence of the Great spotted and Lesser spotted Woodpeckers, the latter as “Rare in mountains but sedentary; it migrates during winter”.

Finally, GIGLIOLI (1907) wrote that Zodda alluded to a specimen of Black Woodpecker in the Pistone collection, though when he personally went visiting that collection he did not find trace of that nor Pistone mentioned it. Moreover, he stated that European green Woodpeckers were very scarce in southern Italy, nevertheless they were present in Sicily, and he considered the Lesser spotted Woodpecker as sedentary in Italy and lacking in Sicily.

MARTORELLI (1906) did not add anything new to the presence of woodpeckers in Sicily and in Calabria. Concerning the Black Woodpecker, TRISCHITTA (1919) quoted BENOIT (1840), MALHERBE (1842-43), DODERLEIN (1869), SALVADORI (1872) and Doderlein's subsequent rectification of 1873; moreover, he quoted also GIGLIOLI (1886) and his visit to the Auteri collection, defending Benoit's position. To support him he availed himself of POWER's argumentations (1842). TRISCHITTA (1919) specified that the Benoit collection was given to the University of Messina and that, following the 1908 earthquake, Giuseppe Sturniolo recovered a Black Woodpecker that unfortunately did not have any label. Further, according to TRISCHITTA (1919) Giglioli visited the Pistone collection before 1890, while Pistone got the Black Woodpecker specimen (as he told to Trischitta himself) only during the summer of 1900 or 1901 "He received it in flesh from an old farmer, who claimed it was killed in the woods of Messina". Trischitta, then, used ZODDA's information (1901-1905) about the fact that he could observe a specimen of Black Woodpecker from Messina, in the Pistone collection. ZODDA (1901-1905), with regard to this species, wrote "Within our Island it only lives in the tall tree woods of Messina, and it is extremely rare", whereas on European green Woodpeckers he commented "In Sicily it is sedentary, it lives in oak, chestnut and hazelnut forests, etc. in the province of Messina, though it is most common in the inner part of the province rather than in the coastal region. There are no records of it in the eastern part of Fiamedinisi woodland whereas it is more frequent towards the western part of it. It is common in Ucria, Alcara li Fusi, Castell'Umberto etc. There are no trace of it in other areas". About the Middle spotted Woodpecker, ZODDA (1901-1905) stated "It is extremely rare in Valdemone woodlands, but it is less rare in Madonie. During winter, it leaves to settle in other uplands (such a behaviour was also registered by MINÀ PALUMBO, 1856-57 and Minà Palumbo and Morici in GIGLIOLI, 1890). There are no records of its presence in other regions". Finally, with regards to the Lesser spotted Woodpecker, he said "It is more common, though still rare, in the east and west part of northern Sicily, in Messina, as well as in Calabria and in the rest of the island it is unknown".

ARRIGONI DEGLI ODDI (1929) reports are based on second-hand information: he considered the well-known Sicilian specimen of Black Woodpecker preserved in the collection of Trischitta from Messina, which previously formed part of the Pistone collection that was destroyed during the earthquake in 1908 (see above). About the European green Woodpecker he stated that it was uncommon in Sicily (probably referring to Doderlein's opinion); he believed the Lesser spotted Woodpecker breeding in Sicily, probably also referring to Doderlein (who then amended the information, as previously mentioned). In spite of this, the Arrigoni degli Oddi collection contains a

Lesser spotted Woodpecker specimen (ex SgROI) from the Nebrodi Mountains dated back to February 1899 (see FOSCHI *et al.*, 1996).

GRASSO (1944) reported the presence of both the European green and the Great spotted Woodpeckers from Caltagirone (Catania); it is important to highlight that TARANTO ROSSO (1844) analyzed the same area and among “woodpeckers” he registered the Wryneck alone.

ORLANDO (1956) wrote “Until the end of the last century, the European green Woodpecker was quite common in Sicily, and it was quite common in the provinces of Palermo, Messina, Catania, Enna and Caltanissetta; it is unknown whether it populated the province of Agrigento; it did not live in the provinces of Siracusa (source: Riera) and Trapani (source: Venezia from Castelvetro). Nevertheless, since the first decade of this century it was quite rare and we could register the presence of few specimens only in the provinces of Palermo, Messina and Catania. An adult male specimen in my collection comes from Gibilmanna woodland and was captured in the Leggrecore locality in 1916. Since 1930 I have been searching it, in vain. In 1930’s the European green Woodpecker was present, for example, in the Malabotta woodland, in the province of Messina; in 1934 my researches within those areas were unsuccessful... To conclude: the presence of the European green Woodpecker in Sicily, certain until 1915 and quite certain, though in few and quite limited areas, until 1930, today can be defined as uncertain, with a scarce number of specimens and it is being on verge of extinction”. With regards to the Lesser spotted Woodpecker he stated: “I may repeat the considerations I previously made for European green Woodpeckers. I have an old adult male specimen from Gibilmanna forests, locality Bosco, captured in 1908, it was believed to be living in the provinces of Palermo (Madonie, Forest Cava, *fide* Ajola) and Catania (woods of Sperlinga and Intronata, *fide* Mocciano) until 1930. Nevertheless, I have been looking for it for 25 years now...”.

Recently, in the first Sicilian birds atlas (LO VERDE & MASSA, 1985), the presence of the European green Woodpecker is commented as follows “Recent (1981) possible attempts of migrating or nesting (source: A. Priolo, F. Tassi)”; IAPICHINO & MASSA (1989) clarified that those observations were made by F. Tassi on the 22nd of November 1981 and by A. Priolo in May 1982 nearby Bronte, though they are fleeting remarks, thus uncertain.

LO VALVO (1999) mentions the European green along with the Lesser spotted Woodpecker for their presence in museums, however he did not specifically examine them, for he wrote “I still have doubts”.

Finally, CORSO (2005) gave some very general observations on the European green Woodpecker, which he presumed that may have been confused with the female of a Golden Oriole.

These are the specimens of woodpeckers (Great spotted Woodpecker

excluded) present in Sicilian museums: 2 Lesser spotted Woodpecker, 3 European green Woodpecker, 1 Black Woodpecker (see ORLANDO, 1956). In particular, woodpeckers exhibited at Terrasini Museum have the following data; Black Woodpecker, adult male, Sicily, Forests in province of Messina ante 1885 ex Benoit's collection, ex Sturniolo collection (see ARRIGONI DEGLI ODDI, 1929, p. 347); European green Woodpecker, male, Cefalù, loc. Legracore Sicily, no date. (Figs 1-3)



Fig. 1 — European green Woodpecker *Picus viridis*, male collected at Cefalù, loc. Legracore Sicily, now preserved at Museo Regionale of Terrasini (Palermo).

Calabria

Woodpeckers were first mentioned in Calabria by COSTA (1839) who wrote: "With the exception of two species of *Picus* genus living in the wood and mountain areas, I did not register the presence of other species while staying in Aspromonte. The first one I saw was *Picus martius* (1), also known in the area with the vernacular name of Colà Pizzicafarro (2)". He also added: "This area is said to be inhabited also by the so called "Gatto di Montagna" (Cat of the mountain) woodpecker, but I didn't get the chance to see one...". COSTA (1857) reported for the Black Woodpecker the dialectal name used in Calabria "Colajàppicu ... is rare in the heights of Aspromonte, the Gran Sasso d'Italia and in the beech woods". DODERLEIN's handwritten notes (ca. 1890) recorded that the Black Woodpecker was also present in the Sila area. GIGLIOLI (1881) generically claimed that the Lesser spotted Woodpecker was "widespread throughout Italy". Concerning the Black Woodpecker in 1886 GIGLIOLI stated "Professor A. Fiori wrote from Catanzaro on the 7th June of 1884, that he confirms the presence of this species in the Sila area (Calabria), although he did not encounter any specimen". In the appendix of the same book he mentioned the vernacular name of the Black Woodpecker used in Calabria. He gave no further indication concerning other woodpeckers.

LUCIFERO (1898-1901) added "In 1886 I was writing to Professor Giglioli... in many of the excursions I took part to in the Sila, only once I had the chance of seeing a pair of Black Woodpeckers in the midst of a thick pine forest". Still, LUCIFERO (1898-1901) was searching for the Black Woodpecker, as advocated by Giglioli "In August 1889, from Mongiana, a characteristic town in the Apennines in the province of Catanzaro, my brother-in-law Giuseppe Morabito, sent me two beautiful specimens... in October 1889, Professor Daniele Levato from Magisano (in the province of Catanzaro) kindly gifted me with the head of a Black Woodpecker, that he received from a hunter of his hometown". As for the Lesser spotted Woodpecker he wrote: "Not very frequent, but sedentary. I saw it, during the winter, in the woods along the Neto, on the borders of the coastal region and I killed many of them. I saw it in the Sila, in the middle of a beech forest in the August of 1884". The European green Woodpecker was reported as "Sedentary, but quite rare. In January 1886, I spotted one in the Piana di Cerchiara (in the province of Cosenza) and another one on February of that same year, nearby the Neto... in March 1890 I was sent a beautiful specimen from Mongiana. In December 1893, Mr. Achille Arcuri from Rocca di Neto killed a female in Corazzo (coastal area near Crotona); and I myself, killed a male in that same area, in January 1894". Concerning the Black Woodpecker GIGLIOLI (1889) reported the same information as Lucifero did for the Sila. He considered the European green Wood-



Fig. 2 — Black Woodpecker *Dryocopus martius*, adult male collected in Sicily, woods in province of Messina ante 1885 (ex Benoit's collection, ex Sturniolo collection). This old specimen was restored by the taxidermist G. Ajola and now is preserved at Museo Regionale of Terrasini (Palermo).



Fig. 3 — Lesser spotted Woodpecker *Dendrocopos minor*, adult male collected at Cefalù (Sicily), 1908. Specimen preserved at Museo Regionale of Terrasini (Palermo).

pecker common and sedentary, in the province of Reggio Calabria (source: Moretti). Later, GIGLIOLI (1890) also reported the same data obtained by his collaborator Moretti from Radicena (Reggio Calabria), considering the European green Woodpecker, as “quite common and sedentary”.

DE FIORE (1890) reported the same information of COSTA (1857) on the Black Woodpecker, recorded from Aspromonte. He also stated that Giglioli saw a Black Woodpecker in Naples zoo that “according to Professor Costa had been captured in Aspromonte”. DE FIORE (1890) also recorded the same data as Fiori (in GIGLIOLI, 1886) and LUCIFERO (1898-1901) for the Sila woods, with these only original words “I know that it has been observed in Cariglione on August 1887. Therefore it has been confirmed that this species can be found in Calabria, however rare”. As for the European green Woodpecker, DE FIORE (1890) wrote “It is uncommon: I have seen a few near the mountains of Taverna, but never near those of Maida. It appears to be more common in the Reggio province”. MOSCHELLA (1891) wrote about the Great spotted and the European green Woodpeckers; on the latter he quoted “This bird is not very common in Reggio, but in severe winter conditions it can be observed in the woods. I was once gifted with one from Doctor Lacava on 3rd November 1887, that had been killed in Cardeto. Another one was given to me by Mr. Vincenzo Medici, and it was captured in Bianconovo on February 1891”. MARTORELLI (1906) more generically wrote that the European green and the Lesser spotted Woodpecker are both present in Italy, while he on the 18th January 1902 in a market in Milan saw an adult male Middle spotted Woodpecker killed in Calabria. As for the Black Woodpecker he wrote “Apparently now it is not so rare in the highest forests of Calabria”. Also GIGLIOLI (1907) listed the Black Woodpecker as being sedentary but uncommon in the Sila. He obtained many specimens from Sila, including one from CROPALATI (Cosenza). Writing about the Great spotted, the Lesser spotted and the European green Woodpecker PISANI (1907), with regards to Rossano Calabro, added that “They are not frequent and live in highly wooded mountains”. ARRIGONI DEGLI ODDI (1929) stated that the presence of the Black Woodpecker had to be confirmed in Calabria, adding that he only knew the specimen of CROPALATI. LUCIFERO (1904), in a paper written just to integrate some records of ARRIGONI DEGLI ODDI (1929) on Black Woodpecker in Sila, added: “I asserted and proved my assertion, sending two specimens of this species, killed in our Apennines, to Professor Giglioli in Florence in August 1889”. MOLTONI (1940) observed and captured one European green Woodpecker in the surroundings of Camigliatello, one Lesser spotted Woodpecker between Rovito, Lappano and Camigliatello, while as for the Black Woodpecker, he didn’t observe and reported data from other Authors, improving Arrigoni degli Oddi’s words and explaining how the adult female captured in

Cropalati, Cosenza province, had been captured at 367 m, not at 3,542 m asl, and that it is preserved in the museum of Florence. In the third edition of MARTORELLI (1960), Moltoni and Vandoni edited a note about the Black Woodpecker as "Still being present in some parts of the Apennines in Calabria". STRESEMANN (1957) observed 6 individuals of the Black Woodpecker in the beech woods of the Pollino National Park, and highlighted, citing Moltoni, that from 1895 it was no longer seen in Calabria. He also observed the Lesser spotted Woodpecker, alone or in pairs, at 1100-1400 m asl, while he saw one European green Woodpecker at 1200 m asl.

DI CARLO (1961) wrote about the Black Woodpecker "One of the main aims of our journey to Calabria was to find the Black Woodpecker, that had been already found in the past, but after half a century Stresemann observed only one in the Pollino National Park". Di Carlo did not have the chance to see it, but one of the group travelling with him (Sevesi) heard one in the woods of the Madonna del Pollino. Among the other woodpeckers in the Pollino area, not only does he mention the Great spotted Woodpecker but also the European green Woodpecker. The same DI CARLO (1962) in his second paper on the other parts of Calabria, stated that the European green Woodpecker was also found in the woods of the Piani di Michelina area and Serra San Bruno.

MOLTONI (1964) confirmed the presence of the European green Woodpecker, Lesser spotted, Middle spotted and the Black Woodpeckers within the Sila area. He also reported the picture of two Black Woodpeckers killed in Giordanello. More recently BEVACQUA (1984) observed the Black Woodpecker in the Sila Piccola area. New studies carried out in that same decade from the Department of Ecology of the University of Calabria, in the protected areas of the region, confirm nesting of the Black Woodpecker in pure or mixed formations of black pine and beech forests in the Sila Grande (MINGOZZI, 1984), in the mounts of Orsomarso (MINGOZZI, 1994), as well as in Aspromonte, however sporadic (BRANDMAYR *et al.*, 1996). The presence and breeding of the Middle spotted Woodpecker is only confirmed in an area of the Sila Grande, in mixed turkey oak, beech and pine woods (MINGOZZI, 1984). As for the other species, researches carried out by the University of Calabria confirm the diffusion in every forest formation of the regional territory of the Great spotted Woodpecker, while the European green and the Lesser spotted Woodpeckers appear to be less frequent (the Lesser spotted Woodpecker is most commonly found in mature chestnut groves or in riparian broadleaf tree formations). The data, partly unpublished, on the distribution of the five species (as for the Sila Grande, it is possible to refer to SORACE, 2008), as in other parts of Italy, have been summarized by BRICHETTI & FRACASSO (2008). This framework (that confirms the spread of the Black Wood-

pecker in high tree forest formations of the whole Apennines, the wide regional distribution of the Great spotted Woodpecker, of the European green Woodpecker, and partly, of the Lesser spotted Woodpecker and the localization of the Middle spotted Woodpecker only in Sila Grande) reflects a strong increase in terms of knowledge of the ecology and the geography of the area. However evaluations on the consistency and the dynamic trend of the population still remain unknown.

CONCLUSIONS

The present study assessed the status of woodpeckers in Calabria and Sicily. In brief the four species of woodpeckers are certainly historically present in Calabria while in Sicily the presence of the Green Woodpecker and the Lesser spotted Woodpecker is certain while the regular presence of the Middle spotted Woodpecker and Black Woodpecker remains doubtful. The latter, during the past, was by far more widespread throughout the whole Peninsula. GIGLIOLI (1886), as for the Black Woodpecker, reported that Savi wrote about it as living “in the thick woods of Sasso Forte, in the Tuscan Maremma; now they, woods and woodpecker have both disappeared”. It was also present in the pine forests of Ravenna and in other parts of the Apennines where today appears in expansion (cf. CECCARELLI, 2015).

Sightings in other Italian areas, during the last fifty years, as in the province of Salerno (KALBY, 1976; MASSA & MASSA, 1978), Abruzzo (CASTIGLIA *et al.*, 1976) and the recent reports from the Po Valley (see LONGO *et al.*, 2002) as well as the breeding records in the Friuli Venezia Giulia plains confirm the wide spreading of the species (UTMAR & PADOVAN, 2005) (see for a review CAMPEDELLI *et al.*, 2012). According to all these observations in the rest of Italy, the Black Woodpecker was probably present also in Sicily, as breeder bird. Moreover, the recent observation of the Black Woodpecker at Portella Castanea (Peloritani Mts, Messina) (PULVIRENTI, 2015) confirms the possibility that in the past this species was accidentally immigrating from nearby Calabria, and confirms what was suggested by DODERLEIN (1872) “...coming to Sicily from the north”.

The reasons for the extinction of the Lesser Spotted Woodpecker seem obscure if considering the ubiquity of the species. Probably the periodic cutting of forests and the *debacle* of forests in 1800's and during the World Wars (LA MANTIA, 2009) caused the disappearance of demanding forest species, as presumed by MASSA & LA MANTIA (2007). The surface of woods was estimated on about 100,000 ha in 1819, 27,000 in 1847, 98,000 in 1911, 85,000 in 1947 (LA MANTIA, 2009). During this time, woods and also spontaneous

riparian vegetation were cutted and in particular standing dead trees were not left. The same goes for the chestnut woods.

The results of this study identified as a possible “candidate” among the woodpeckers for reintroduction in Sicily the Lesser spotted Woodpecker. In order to evaluate the feasibility of its reintroduction, we followed the schemes proposed by AA.VV. (2007) integrated with IUCN/SSC (2013). First and foremost the Lesser spotted Woodpecker covers a wide area that includes the Iberian Peninsula through a great part of Europe and the mid-latitudes of the Asian continent, manifesting a minor population also in north-east Algeria and in north-west Tunisia (Krumiria) (HEIM DE BALSAC & MAYAUD, 1962; ETCHECOPAR & HÜE, 1964; ISENMANN & MOALI, 2000; ISENMANN *et al.*, 2005). Therefore, Sicily shows some continuity with the other populations. The southern populations appear to be strictly stationary, only having limited dispersion displacements that mainly concern younger population. They rarely exceed a few dozen kilometers. Thus, this may explain why there has not been a recolonization in Sicily for it is separated from Calabria by an “arduous” stretch of sea which represents a challenge for small woodpeckers.

The species inhabits a wide variety of forest types, both for composition and structure (beech forests, oak forests, maple mixed woods, lindens and ash trees, chestnut groves, etc.), settling in open or marginal areas, as well as linear complexes (mainly along the waterways) or secondary environments, as cultivated seed orchards and great historical parks (BRICHETTI & FRACASSO, 2008). The Lesser spotted Woodpecker requires larger formations and the presence of mature, withered or dead standing trees. The latter are particularly important for their feeding, territorial display and nesting. It is also useful to point out that in North Africa the species inhabits cork oak forests of *Quercus canariensis* (an oak that may be classified as deciduous-semievergreen) (HEIM DE BALSAC & MAYAUD, 1962; ETCHECOPAR & HÜE, 1964; ISENMANN & MOALI, 2000; ISENMANN *et al.*, 2005).

The Bern Convention and the European Union Annex I of the Birds Directive 79/409/CEE (now 2009/147/CE) included the Lesser spotted Woodpecker among the species that require special protection measures. It is also listed in the IUCN Red List and is particularly protected in Italy under the existing hunting legislation (Art. 2, Law 157/92).

The possible founders would be taken in a number such as not to affect the population dynamics. Nonetheless, the number of *D. minor* specimens inhabiting the Apennines is, overall, stable (BRICHETTI & FRACASSO, 2008). Moreover, its population in Calabria lives in a similar environment (BERNARDO *et al.*, 2010a, 2010b) to that of Northern Sicily (Madonie and Nebrodi, also called Sicilian Apennines) and along the slopes of mount Etna, where the species used to live. It is also useful to highlight that within the regional parks

(Nebrodi, Madonie and Etna) regulations prohibit logging in extended areas. Considering that the reasons that have led to the extinction of the Lesser spotted Woodpecker in Sicily have now been removed, a re-introduction of the species would represent a turning point for environmental regeneration.

As previously observed for predators on top of the food chain (Northern Goshawk *Accipiter gentilis*, and forestry nocturnal birds, SERGIO *et al.*, 2005), also woodpeckers are to be considered as reliable indicators for the forest species, on a medium scale area (COLPI *et al.*, 2008). Their ability to drill and gain access to exclusive ecological recesses allows creating the conditions for the expansion of other species, classified as “secondary users”, that use recesses drilled by Woodpeckers as nests or shelters (VALLEJOS BARRA, 2010). This would represent an advantage both for biodiversity and for an increasing ecosystem stability.

Acknowledgements — We would like to thank Mario Genchi, Bruna Burato (Library of the Museum of Natural History of Verona), Daniela Patti and Francesca Tignola (Library of the SAF Department of the University of Palermo) for their help in the reference search. A heartfelt thank goes also to Salvatore Pasta for his help in translating German texts; also to Fabio Lo Valvo for providing information on the specimen exhibited in museums and to Renzo Ientile for verifying the data on some Sicilian collections. We would like to thank Francesca Quatrini for helping with language editing, and Emanuela Palmisano (Museo Regionale of Terrasini, Palermo) who authorized us to take some photographs of woodpeckers preserved in the museum.

REFERENCES

- AA. VV., 2007. Linee guida per l'immissione di specie faunistiche. *Quad. Cons. Natura*, 27, Min. Ambiente. Ist. Naz. Fauna Selvatica.
- ARRIGONI DEGLI ODDI E., 1929. Ornitologia italiana. *Hoepli*, Milano.
- BENOIT L., 1840. Ornitologia Siciliana. *Stamperia G. Fiumara*, Messina.
- BERNARDO L., PASSALACQUA N.G. & SPAMPINATO G., 2010a. Le serie di vegetazione della Calabria. In: Blasi C. (ed.), *La vegetazione d'Italia. Palombi e partner srl*, Roma, pp. 411.
- BERNARDO L., PASSALACQUA N.G. & SPAMPINATO G., 2010b. Carta delle serie di vegetazione della Calabria. In: Blasi C. (ed.), *La vegetazione d'Italia*, carta delle serie di vegetazione, scala 1:500:000. *Palombi e partner srl*, Roma.
- BEVACQUA D., 1984. Indagine preliminare sulla distribuzione del Picchio nero *Dryocopus martius* nella Sila Piccola, provincia di Catanzaro. *Picus*, 10: 73-76.
- BIRBECK R., 1854. Notes on the birds of Italy and Sicily made in 1853. *Zoologist*, 12: 4249-4251.
- BRANDMAYR P., CAGNIN M., MINGOZZI T. & PIZZOLOTTO R., 1996. Map of zoocoenoses and evaluation for the Menta River dam in Aspromonte (Calabria, Italy). *Z. Ökologie u. Naturschutz*, 5: 15-28.
- BRICHETTI P. & FRACASSO G., 2008. Ornitologia Italiana, Vol. 4 (Apodidae-Prunellidae). *A. Perdisa Ed.*, Bologna.
- CAMPEDELLI T., BUVOLI L., BONAZZI P., CALABRESE L., CALVI G., CELADA C., CUTINI S., DE CARLI E., FORNASARI L., FULCO E., LA GIOIA G., LONDI G., ROSSI P., SILVA L. & TELLINI FLORENZANO G., 2012. Andamenti di popolazione delle specie comuni nidificanti in Italia: 2000-2011. *Avocetta*, 36(2): 121-143.

- CAMPEDELLI T., CECCARELLI P.P., LONDI G., CUTINI S., TELLINI FLORENZANO G. & AGOSTINI N., 2012. L'ecologia del picchio nero, *Dryocopus martius* nelle foreste casentinesi come chiave per la possibile espansione della specie nell'Appennino. *Riv. Ital. Orn.*, 81(1): 43-61.
- CASTIGLIA G., DI CARLO E.A. & TABARRINI G., 1976. Il picchio nero (*Dryocopus martius*) e il picchio di Lilford (*Dendrocopos leucotus lilfordi*) nell'Appennino centrale, *Riv. Ital. Orn.*, 46: 169.
- CECCARELLI P., AGOSTINI N. & ALBERTI D., 2015. Picchio nero *Dryocopus martius*. Parco nazionale delle Foreste Casentinesi, Monte Falterona e Campigna. <http://www.arcgis.com/home/item.html?id=a789997fb8fb4c5994ece7928348b9f7> (last access, May 2015).
- COLPI C., VARASCHIN M., ZENATELLO M. & LUISE R., 2008. Selvicoltura ed avifauna sensibile. Il caso del Picchio nero (*Dryocopus martius*) nel Parco Nazionale delle Dolomiti Bellunesi. *Atti III Congr. Naz. Selvicoltura*: 163-168.
- CORSO A. & IENTILE R., 1994. La Collezione ornitologica Alessandro Rizza del Liceo Classico T. Gargallo di Siracusa. *Naturalista sicil.*, 18: 297-299.
- CORSO A., 2005. Avifauna di Sicilia. *L'Epos ed.*, Palermo.
- COSTA O., 1839. Fauna d'Aspromonte e sue adiacenze: uccelli. *Atti Accad. Sc. Napoli*, 4: 70-73.
- COSTA O.G., 1857. Fauna del regno di Napoli ossia enumerazione di tutti gli animali che abitano le diverse regioni di questo regno e le acque che le bagnano: contenente la descrizione de nuovi o poco esattamente conosciuti. Uccelli. *Tipografia Gaetano Sautto*, Napoli.
- CUPANI F., 1713. Panphyton Siculum. 3 Vol. *Ex Typogr. Regia A. Epiro*, Palermo (ristampa a cura di Pastena C., Anselmo A. & Zimmardi M.C., *Regione Siciliana*).
- DE FIORE C., 1980. Materiali per un'Avifauna Calabria. *Tipografia Terme Diocleziane*, Roma.
- DE NATALE F. & GASPARINI P., 2011. I cambiamenti nel periodo 1985-2005. Pp. 585-589 in: Gasparini P., Tabacchi G. (a cura di), L'Inventario Nazionale delle Foreste e dei serbatoi forestali di Carbonio INFC 2005. Secondo inventario forestale nazionale italiano. Metodi e risultati. Ministero delle Politiche Agricole, Alimentari e Forestali; Corpo Forestale dello Stato. Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Unità di ricerca per il Monitoraggio e la Pianificazione Forestale. *Edagricole-II Sole 24 ore*, Bologna.
- DI CARLO E.A., 1961. Ricerche ornitologiche attraverso la Calabria. Parte I^a: dal Pollino alla Sila. *Riv. Ital. Orn.*, 32: 40-100.
- DI CARLO E.A., 1962. Ricerche ornitologiche attraverso la Calabria. Parte II^a: dalle Serre all'Aspromonte. *Riv. Ital. Orn.*, 32: 234-279.
- DODERLEIN P., 1869-1874. Avifauna del Modenese e della Sicilia. *Giorn. Sci. nat. econom.*, 5: 137-195; 6: 187-236; 7: 9-72; 8: 40-124; 9: 28-93; 10: 35-71, 133-148.
- DODERLEIN P., 1872. Alcune generalità sulla fauna sicula dei Vertebrati. *Ann. Soc. Natur. in Modena*, 6: 1-60.
- DODERLEIN P., 1881. Rivista della fauna sicula dei Vertebrati. *Nuove Effemeridi Siciliane*, 11: 1-92.
- DODERLEIN P., ca. 1890. Note manoscritte all'Avifauna del Modenese e della Sicilia.
- ETCHECOPAR R D & HUE F. 1964. Les Oiseaux du Nord de l'Afrique. *Boubée & Cie*, Paris.
- FOSCHI U.F., BULGARINI F., CIGNINI B., LIPPERI M., MELLETTI M., PIZZARRI T. & VISENTIN M., 1996. Catalogo della collezione ornitologica "Arrigoni degli Oddi" del Museo Civico di Zoologia di Roma. *Ric. Biol. Selvaggina*, INFS Bologna, 97: 1-311.
- GALVAGNI G.A., 1837-1839. Fauna Etnea ossia materiali per la compilazione della zoologia dell'Etnea. Memoria sesta per servire di proemio alla ornitologia dei contorni del monte. *Atti Accad. Gioenia Sci. Nat.*, 14: 271-300.
- GIGLIOLI E.H., 1881. Elenco delle specie di uccelli che trovansi in Italia stazionarie e di passaggio,

- colle indicazioni delle epoche della nidificazione e della migrazione. *Annali Agricoltura*, Firenze, 36: 1-133.
- GIGLIOLI H.E., 1886. Avifauna italiana. *Le Monnier*, Firenze, 624 pp.
- GIGLIOLI H.E., 1889. Primo resoconto dei risultati dell'Inchiesta Ornitologica. Parte I. Avifauna Italiana. *Le Monnier*, Firenze, 706 pp.
- GIGLIOLI H.E., 1890. Primo resoconto dei risultati dell'Inchiesta Ornitologica in Italia. Parte II Avifauna locali. *Le Monnier*, Firenze, 693 pp.
- GIGLIOLI H.E., 1907. Secondo resoconto dei risultati dell'Inchiesta Ornitologica. Avifauna italiana. *Stabilimento Tipografico S. Giuseppe*, Firenze, 784 pp.
- GRASSO S.E., 1944. Elenco degli uccelli del territorio di Caltagirone. *La Nuova Grafica*, Napoli, 44 pp.
- HEIM DE BALSAC H. & MAYAUD N., 1962. Les oiseaux du Nord-Ouest de l'Afrique. *P. Lechevalier ed.*, Paris.
- HOFFMANN A., 2011. Si fa presto a dire bosco. Pp. 25-27 in: Hoffmann A., Cibella R., Bertani R., Miozzo M., Fantoni I. & Luppi S. (a cura di), Strumenti conoscitivi per la gestione delle risorse forestali della Sicilia. Sistema Informativo Forestale. *Assessorato Territorio e Ambiente. Regione Sicilia*.
- IAPICHINO C. & MASSA B., 1989. The Birds of Sicily. Check-list n°11. *British Ornithologists'Union*, London.
- ISENMANN P., GAULTIER T., EL HILI A., AZAFZAF H., DLENSI H. & SMART, M., 2005. Oiseaux de Tunisie/Birds of Tunisia. *Soc. Études Orn. France*, Paris, 432 pp.
- ISENMANN P. & MOALI A., 2000. Oiseaux d'Algérie/Birds of Algeria. *Soc. Études Orn. France*, Paris, 336 pp.
- IUCN/SSC, 2013. Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. *IUCN Species Survival Commission*, Gland, Switzerland, viiii + 57 pp.
- KALBY M.L., 1976. Il picchio nero in provincia di Salerno. *Riv. Ital. Orn.*, 46: 166-167.
- LA MANTIA T., 2008. I nomi dialettali dei vertebrati in Sicilia. Pp. 393-411 in: AA.VV., Atlante della biodiversità della Sicilia. Vertebrati terrestri. *Studi e Ricerche*, 6, Arpa Sicilia, Palermo.
- LA MANTIA T., 2009. La biodiversità delle formazioni naturali e seminaturali in Sicilia: cambiamenti e ipotesi di gestione. *Atti Terzo Congr. Naz. Selvicoltura*, Accademia Italiana di Scienze Forestali, Firenze, 199-204.
- LA MANTIA T., BONAVIRI L. & MASSA B., 2014a. Ornithological communities as indicators of recent transformations on a regional scale: the case of the Sicily island. *Avocetta*, 38: 67-81.
- LA MANTIA T., LO DUCA R., MASSA B., NOCENTINI S. & RÜHL J., 2014b. La biodiversità dei boschi siciliani. Parte I: l'avifauna. *Italia forestale e montana*, 69 (3): 173-193.
- LA MANTIA T. & MASSA B., 2008. I nomi dialettali dei Vertebrati di Sicilia. Uccelli. Pp. 416-451 in: AA. VV., Atlante della Biodiversità della Sicilia: Vertebrati terrestri. *Studi & Ricerche* 6, Arpa Sicilia, Palermo.
- LA MANTIA T. & MASSA B., 2012. Il contributo di Jeannette Villepreux Power alla conoscenza e agli aspetti zoologici e del paesaggio della Sicilia dell'800. Pp. 339-349 in: D'Angelo M., La Mantia T. & Massa B. (a cura di), Jeannette Villepreux Power tra storia, scienza e cultura nella Sicilia dell'800. *Naturalista sicil.*, 36.
- LO VALVO F., 1999. Vertebrati estinti in Sicilia e conservati in strutture museali o didattiche. *Naturalista sicil.*, 23: 397-405.
- LO VERDE G. & MASSA B., 1985. Lista rossa delle specie nidificanti in Sicilia. Pp. 206-223 in: Massa B. (red.), Atlas Faunae Siciliae-Aves. *Naturalista sicil.*, 9 (n°spec.).
- LONGO L., MARTIGNONI C. & BERTOLI R., 2002. Svernamento di picchio nero, *Dryocopus martius*, nella riserva naturale di bosco della Fontana (Mantova). *Riv. Ital. Orn.*, 72(1): 81-82.
- LUCIFERO A., 1898-1901. Avifauna di Calabria. Elenco delle specie di uccelli stazionarie o di pas-

- saggio in Calabria. *Avicula*, 1898: 39-43, 90-92; 1899: 24-25, 35-39, 81-85, 109-113, 144-151, 164-169; 1900: 14-17, 49-51, 66-70, 98-102, 154-161; 1901: 4-10, 37-39, 89-94, 138-142 (Ristampati e raccolti in un volume dal titolo "Avifauna e mammiferi della Calabria" *Greentime*, 2003).
- LUCIFERO A., 1904. Brevi osservazioni su poche specie di uccelli sedentari o di passaggio in Calabria enumerati dal sig. conte Arrigoni degli Oddi nel Manuale di Ornitologia Italiana. *Avicula*, 77-82.
- MALHERBE A., 1842-1843. Faune ornithologique de la Sicile. *Mém. Acad. Roy. Metz*, 24(2): 1-241.
- MALHERBE A., 1843. Description d'une nouvelle espèce du genre *Pic* de l'Algérie. *Mém. Acad. Roy. Metz*, 24: 242-243.
- MALHERBE A., 1845: Description de trois espèces nouvelles du genre *Picus*, Linné. *Re. Zool.*, 1: 373-377.
- MALHERBE A., 1849 [1847]. Nouvelles classifications des Picinés ou Pics. *Mém. Acad. Roy. Metz*, 30: 312-367.
- MALHERBE A., 1850. Descriptions de quelques espèces de Picinés. *Rev. Magasin Zool.* (2) 2: 154-158.
- MALHERBE A., 1852. Description de nouvelles espèces de Picidae. *Rev. Magasin Zool.*, (2) 4: 550-555.
- MALHERBE A., 1854. Nouvelles espèces de Pucidés. *J. Orn.*, 2: 171-172.
- MALHERBE A., 1857. Description de quelques grimpeurs du genre Linnéen *Picus*. *Bull. Soc. Hist. nat. Moselle*, 7: 1-20.
- MALHERBE A., 1861-62. Monographie des Pucidés, ou Histoire naturelle des Pucidés, Picumminés, Yuncinés ou Torcols; comprenant dans la première partie, l'origine mythologique, les mœurs, les migrations, l'anatomie, la physiologie, la répartition géographique, les divers systèmes de classification de ces oiseaux grimpeurs zygodactyles, ainsi qu'un dictionnaire alphabétique des auteurs et des ouvrages cités par abréviation; dans la deuxième partie, la synonymie, la description en latin et en français, l'histoire de chaque espèce, ainsi qu'un dictionnaire alphabétique et synonymique latin de toutes les espèces. *Typ. de J. Verronnais*, Metz.
- MARTORELLI G., 1906. Gli Uccelli d'Italia. *Cogliati*, Milano.
- MARTORELLI G., 1960. Gli Uccelli d'Italia. Terza ed. riveduta e corretta da E. Moltoni e C. Vandoni. *Rizzoli*, Milano.
- MASSA B., 2009. La fauna illustrata da Francesco Cupani nel *Panphyton Siculum*. *Naturalista sicil.*, 33: 213-224.
- MASSA B. & LA MANTIA T., 2007. Forestry, pasture, agriculture and fauna correlated to recent changes in Sicily. *Forest@*, 4(4): 418-438.
- MASSA R. & MASSA B., 1978. Nuove notizie sul Picchio nero *Dryocopus martius* (L.) in Campania. *Riv. ital. Orn.*, 48: 339-340.
- MASSA B. & SARÀ M., 2011. Volume IV: Uccelli. In: Mazzola P. & Raimondo F.M. (a cura di), Iconografia della Storia Naturale delle Madonie di Francesco Minà Palumbo. *Enzo Sellerio Ed.*, 4 volumi.
- MINÀ PALUMBO F., 1853. Catalogo degli uccelli delle Madonie. *Atti Accad. Sc. Lett. Palermo*, n.s. 2: 1-32.
- MINÀ PALUMBO F., 1856-1857. Catalogo degli uccelli delle Madonie (supplemento primo). *La Favilla*, 1 (10-11): 84-86.
- MINGOZZI T., 1987. L'avifauna del Parco Nazionale della Calabria (Sila Grande, Sila Piccola, Aspromonte). analisi faunistico-ecologica delle specie nidificanti. Relazione tecnica. Parco nazionale della Calabria. *Dip. Ecologia Univ. della Calabria*, 75 pp.
- MINGOZZI T., 1994. L'avifauna della riserva naturale orientata "Valle del Fiume Argentino" (Orsomarso, CS): analisi faunistico-ecologica ed indicazioni conservazionistico-gestionali. Coll. Verde, *Min. Ris. Agr. Alim. e Forest.*, CFS, Roma, 96: 1-94.

- MOLTONI E., 1940. Escursione a scopo ornitologico della Grande Sila (Calabria) 25 giugno-14 luglio 1939. *Riv. ital. Orn.*, 10: 229-243.
- MOLTONI E., 1964. L'ornitofauna della Sila (Calabria). *Riv. ital. Orn.*, 34: 1-183.
- MOSCHELLA G., 1891. Gli uccelli di Reggio Calabria. *Tip. F. Morello*, Reggio Calabria, 116 pp.
- ORLANDO C., 1956. I Picini (sottofamiglia Picinae) in Sicilia. *Riv. ital. Orn.*, 26: 78-81.
- PISANI F., 1907. Avifauna calabra (Distretto di Rossano Calabro). *Avicula*, 11 (119-129): 113-121.
- POWER J., 1839. Itinerario della Sicilia riguardante tutti i rami di storia naturale e parecchi di antichità che essa contiene. *Tip. Giuseppe Fiumara*, Messina, 249 pp.
- POWER J., 1842. Guida per la Sicilia. Napoli (2008, ristampa anastatica a cura di D'Angelo M. *Istituto di Studi Storici Gaetano Salvemini*, Messina, 381 pp.).
- PRIOLO A., 1996. Uccelli della Sicilia raffigurati da Cupani nel Panphyton Siculum. *Naturalista sicil.*, 20: 321-410.
- PULVIRENTI A., 2015. Terza segnalazione accertata di Picchio nero *Dryocopus martius martius* (Linnaeus, 1758) per la Sicilia. *Naturalista sicil.*, 39: 71-72.
- RETE RURALE NAZIONALE & LIPU, 2011. Gli andamenti di popolazione degli uccelli comuni in Italia 2000-2010. *MiPAAF*, 36 pp.
- RIGGIO G., 1892. Corrispondenze scientifiche moderne degli animali figurati, Artropodi e Vertebrati, nel *Pamphyton Siculum* del Cupani. *Naturalista sicil.*, 12 (3): 69-73.
- SALVADORI T., 1872. Fauna d'Italia. Uccelli (Ristampa anastatica, *Forni Ed.*, Bologna, 353 pp.).
- SERGIO F., NEWTON I. & MARCHESI L., 2005. Top predators and biodiversity. *Nature*, 436: 192.
- SORACE A., 2008. Uccelli. Pp. 127-154 in: Il patrimonio botanico e faunistico della ZPS Sila Grande. *Agriconsulting SpA, Regione Calabria, PN Sila*.
- STRESEMANN E., 1957. Ein ornithologischer streifzug durch Calabrien. *J. Orn.*, 98: 372-388.
- TARANTO ROSSO E., 1844. Per la inaugurazione del Gabinetto di Storia naturale e Archeologia della Reale Accademia degli Studi di Caltagirone. Discorso del donante Cav. Emmanuele Taranto Rosso. *Stamperia G. Musumeci Papale*, Catania, 88 pp.
- TRISCHITTA A., 1919. Sull'esistenza del Picchio nero (*Dryocopus martius* (L.)) in Sicilia. *Boll. Ist. Zool. R. Univ. Palermo*, 1: 77-80.
- UTMAR P. & PADOVAN P., 2005. Il picchio nero, *Dryocopus martius*, nidificante in pianura nel Friuli Venezia Giulia. *Riv. Ital. Orn.*, 74 (1): 62-64.
- VALLEJOS BARRA G.C., 2010. Estudio de habitat de *Campephilus magellanicus* en Sierras de Bellavista, Chile Central: propuesta para su conservación. Tesi di Dottorato. Magíster en Areas Silvestres y Conservación de la Naturaleza, *Facultad de Ciencias Forestales, Universidad de Chile*.
- ZODDA G., 1901-1905. Contributo allo studio degli Uccelli Siciliani. *Avicula*, 5 :155-158; 6:14-23, 36-40, 100-102 e 134-137; 7:45-48, 65-70, 108-114 e 142-145; 8: 72-75; 9:9-14 (Ristampato nel 1905, pp. 1-50).

Authors' addresses — T. LA MANTIA, I. BUSCEMI, B. MASSA, Department of Agriculture and Forest Sciences (SAF), University of Palermo, Viale delle Scienze Ed.4, Ingr. H - 90128 Palermo (I); e-mail: tommaso.lamantia@unipa.it; T. MINGOZZI, Department of Biology, Ecology and Science of Earth, University of Calabria, P.te P. Bucci, Cubo 4/B - 87036 Rende (CS) (I).

