Status and Distribution of the Breeding Procellariiformes in Malta

John J. Borg & Joe Sultana

Abstract

Three species of the order Procellariiformes, namely Cory's Shearwater Calonectris diomedea, Levantine Shearwater Puffinus yelkouan and European Storm-petrel Hydrobates pelagicus melitensis breed in the Maltese Islands. This work presents an update of their status and an estimation of their population.

Introduction

Three species of Procellariiformes breed in the Maltese islands, namely Cory's Shearwater *Calonectris diomedea*, Levantine Shearwater *Puffinus yelkouan* and European Storm-petrel *Hydrobates pelagicus melitensis*. Due to their nocturnal habits and the choice of nesting sites their breeding numbers can only be estimated roughly. Shearwaters and petrels usually lay their single egg in holes and burrows in cliffs and sea caves and in rubble screes below sea cliffs, thus rendering accessibility to the nesting sites extremely difficult.

Geological Features and Description of Breeding Areas

The Maltese Islands are situated in the centre of the Mediterranean Sea, 83km south of Cape Passero (Sicily) and 334km north of the Libyan coast, at approximately 36°N and 14°E. The main islands are Malta (245.7 km²), Gozo (67.1 km²), and Comino (2.8 km²). Cominotto and Filfla are much smaller but are of great ecological importance. A number of smaller rocks and stacks complete the archipelago. The total length of the coastline is 190 km, 38 km of which consist of sheer cliffs. The seacliffs bordering the southern coasts of Malta and Gozo reach a maximum height of about 230 metres. In most areas, the cliffs are 'honey-combed' with caves, crags, and fissures, situated at various heights and offering ideal nesting sites for the shearwaters. In some areas, large boulders and debris have accumulated throughout the years at the foot of cliffs as well as on ledges, increasing the availability of nesting sites.

Comino, Cominotto, Fungus Rock, and Filfla are the only four offshore islands hosting one or more breeding species. Comino is the only one of these that holds a small permanent human community. The eastern shore of Cominotto is visited by bathers during the summer months. Comino and Cominotto are bird sanctuaries, where hunting and trapping are prohibited, while Fungus Rock and Filfla are legally strict nature reserves where landing is prohibited.

Breeding Colonies

The Maltese Islands may be considered either as one loose, but widespread, colony or as a number of colonies significantly separate from one another within the same archipelago. If we take the latter concept in consideration, than we find five colonies of Cory's Shearwater (Malta, Gozo, Fungus Rock, Comino and Filfla), four colonies of Levantine Shearwater (Malta, Comino, Cominotto and Gozo) and two colonies of European Storm-petrel (Filfla and Gozo) (Table 1).

Island	Species	Total surface area	Biotope
Malta	*C.d, P.y.*	245.7km²	cliffs-boulders
Gozo	*C.d, P.y, H.p.*	7.1km²	cliffs
Fungus Rock	*C.d., P.y?*	0.7ha	cliffs
Comino	*C.d., P.y.*	2.8km²	cliffs-boulders
Cominotto	*P.y.*	9.9ha	cliffs
Filfla	*C.d, P.y?, H.p.*	2.0ha	screes & boulders

Table 1. Island size, biotope and distribution of the three breeding Procellariidae in the Maltese Islands.

Material and Methods

The islet of Filfla was the main seabird research station in Malta from 1968 to 1982. The first visits were initiated by members of the Research Group of BirdLife Malta in 1968 and from these visits it was found that the islet hosted a large colony (8,000-10,000 breeding pairs.) of European Storm-petrel, around 200 pairs of Cory's Shearwater and some Levantine Shearwaters (Sultana & Gauci 1970, 1982).

An accessible part of a Levantine Shearwater colony was discovered on the north-eastern coast of mainland Malta in 1969, and this site has since been regularly monitored to the present day. Another accessible area this time on the south-western coast of Malta was found in 1975. This area has been estimated as holding around 20-25 pairs of Cory's Shearwaters and single pairs of Levantine Shearwaters. A long-term study on the breeding biology and ecology of the Cory's Shearwater was initiated in 1983 (Cachia Zammit & Borg 1986-87, 1988, Borg & Cachia Zammit 1996, Borg 1999, Borg & Sultana 2000).

A survey of the lower parts of the cliffs was started in 1994 along the southern cliffs of Gozo from a boat. The main aim of this survey was to identify the possibility of nesting colonies of the European Storm-petrel. In the course of these visits, a small colony of European Storm-petrels was discovered in a cave, while the breeding of Levantine Shearwater along the Ta'Cenc cliffs was confirmed (Borg & Sultana 1992-94).

When counting the breeding birds, attention was given to the presence of non-breeders, which may consitute over 50% of the birds visiting the colonies in certain periods of the year. Lunar phases were also taken in consideration when counting Cory's and Levantine Shearwaters, as fewer numbers visit colonies on moonlit nights. The first three days after a full moon proved to be optimal as the majority of the breeding birds enter colonies in a short period right up to moon rise. European Storm-petrels appear to be unperturbed by moonlight.

Criteria used for estimating numbers

The following criteria were used to obtain results that were as accurate as possible:

- counting flying and rafting birds in front of colonies soon after the egg-laying period;
- direct observations of the birds arriving at the colonies at night up to three days after the full moon;
- use of play-back recordings;
- counting calling birds in suitable but inaccessible areas;
- ringing and recapture of breeding and non-breeding birds at colonies;
- ringing and recapture of breeding pairs in accessible nest sites;
- ringing of pulli.

Most members of the order Procellariidae nest in crevices, underground, and amongst boulders, making accurate counts very difficult. The numbers presented are minimal figures as the total for the three breeding seabirds on the Maltese Islands has been estimated to amount to between 12,515 and 16,715 breeding pairs (Table 2).

Species	Malta	Gozo	Comino	Filfla	Fungus Rock	Total
C. diomedea	2,500-3000	3,500-4,000	15-20	50-80	25-30	6,090-7,130
P.yelkouan	800-900	550-580	50-80	?	?	1,400-1,560
H. pelagicus	?	>25	?	5,000-8,000	0	5,025-8,025
Total	3,300-3,900	4,075-4,605	65-100	5,050-8,080	25-30	12,515-16,715

Table 2. Estimated number of breeding pairs of the three Procellariidae in the Maltese Islands.

UTM grid maps "Malta East, Malta West and Gozo and Comino", scale 1:25,000, were used to map the sites. The Maltese Archipelago is included in the UTM zone 33S, where it falls within one basic 100-kilometre-grid square called "VV". The 10-kilometre-grid squares involving the entire surface of the islands are thirteen. The one kilometre-grid squares amount to 515 in total.

Species Account

Cory's Shearwater *Calonectris diomedea diomedea*

The Cory's Shearwater is a breeding visitor from late February to late October (Sultana & Gauci 1982, Cachia Zammit & Borg 1986-87). It breeds on sea-cliffs on Malta, Gozo, and Comino and on Filfla. All past authors have listed the Cory's shearwater as a breeding bird, but the numbers given varied from a few scattered pairs to several hundreds (Schembri 1843, Wright 1863, Despott 1916, H.L.C.1953, Roberts 1954, Sultana & Gauci 1970, Borg & Sultana 1990-91, James 1984).

The main breeding concentrations on Malta are situated along the south and south-western coast. Benghisa Point on the western part of Marsaxlokk bay is the extreme limit of its breeding range, and the colony extends all the way up to Ghar Lapsi. An estimate of 1000 to 1500 pairs nest along this stretch of cliff. Only single pairs have been found in the Dingli Cliffs area where Bannerman & Vella-Gafflero (1976) mentioned 'several large colonies'. Breeding birds have also been located along the north-western cliffs in the Mtahleb-Fomm ir-Rih area. Some 200 pairs are estimated to breed there. On the north-eastern cliffs, single calling birds have been heard for several years, but actual breeding had not been confirmed before 1993, when a pair, which raised a chick successfully, was located. At least three other pairs have been observed in the area (Borg & Mallia 1992-94).

Wright (1864) and Bannerman & Vella-Gafflero (1976) claimed that a small colony existed on Comino. In the summers of 1993-97, single birds were heard calling along the eastern coast of Comino and the west coast of Cominotto, and in the spring of 1998 a small colony of about 10-15 pairs was discovered on the north-eastern cliffs of Comino (Borg 1999).

Gozo holds the largest number of breeding pairs, with the highest concentrations situated at Ta' Cenc Cliffs, in the south of the island. This area is estimated to hold between 1,000 and 1,500 pairs, possibly more. Further to the west, towards Xlendi Bay, it is estimated that the area holds 100 to 300 pairs. A small colony at Xlendi Bay was reported to have been abandoned when electricity was introduced (Sultana *et al.* 1975). In the summers of 1994-96, single birds were seen alighting in front of the crevices, but in 1997, the colony was again deserted (pers.obs.). A sub-colony of about 12 pairs was found in crags and amongst boulders to the west of Xlendi Bay in 1994. Several small sub-colonies exist between Xlendi and Wardija Point where numbers have been estimated to be in excess of 1,000 pairs. Breeding was also confirmed on Hagret il-General (Fungus Rock) at Dwejra (Sultana & Cachia Zammit 1988). During recent visits by the present writers in 2000-2001 the population was estimated at 25 to 30 pairs. Along the north-western coast, between Dwejra and San Dimitri, the estimated number of breeding pairs is 300 to 350 pairs, possibly more.

H. A. Trail, who visited Filfla in late July 1949, located 22 occupied nests of shearwaters (presumably Cory's Shearwater, considering the time of year). At night Trail estimated the number of incoming birds at over a thousand, possibly twice as many (Trail 1949-50). Sultana *et al.* (1975) suggested that this figure was exaggerated as a small number of calling birds make enough noise to lead an inexperienced ear into overestimating numbers. On the other hand, if Trail was correct, the sharp decline can only be attributed to be the bombing practice on the islet (Sultana & Gauci 1970). In late July, Trail must have witnessed a large arrival of non-breeders, which at this time of year are usually visiting the colonies (Cachia Zammit & Borg 1986-87). The colony on Filfla was estimated to be less than 30 pairs in the fifties by E.L. Roberts (1954) but 25 years later the colony there was estimated to be about 200 pairs (Sultana *et al.* 1975, Sultana & Gauci 1982).

The population on Filfla was noted to be on the decline and it has been estimated to be in the figure of around 50 pairs, possibly less (Sultana 1986, Borg & Sultana 1990-91). Several morning visits to Filfla carried out between 1991 and 1999 by the present writers resulted in locating 22 accessible nesting sites. Faecal droppings and other signs of breeding were located in front of other deep crags. In the following two summers (2000 and 2001) a slight increase in the breeding colony was noted there.

Levantine Shearwater *Puffinus yelkouan yelkouan*

The Levantine Shearwater is a breeding visitor from early December to mid-July (Borg & Cachia-Zammit 1986-87) with birds visiting land from late October (Borg *et al.* this volume pp. 20-23). Egg laying occurs during the last days of February and the first week of March (pers. obs.) while fledging takes place between the last two weeks of June and the first week of July (Sultana & Gauci 1982 and pers.obs.). After the breeding season the birds, particularly the fledged ones, move into the Black Sea (Sultana & Gauci 1982) but an unknown number of birds remain near the colonies while undergoing moult (Borg *et al.* this volume).

This shearwater was found to be less numerous but with a wider distribution than Cory's Shearwater, as was noted elsewhere (Iapichino & Massa 1989). In Malta, it was found breeding in deep inaccessible narrow crevices, several metres deep. Nests less than a metre deep are rarely found. Nesting crevices are situated from two metres above sea level up to the top ledges of cliffs. Sultana & Gauci (1982) stated that numbers are very hard to estimate, while Bannerman & Vella-Gaffiero (1976) claimed that the breeding population is in excess of 100 pairs.

Calling birds have been heard along the south and southwestern cliffs in areas which are also occupied by Cory's Shearwaters. Only three areas hold double figures. It is estimated that the number of breeding pairs in the Benghisa-Hal-Far area (south-east) is more than 200 pairs, while more than 100 pairs nest between Zurrieq and Ghar Lapsi. Double figures breed along the cliffs at Dingli. Although single birds have been heard along the northwestern cliffs, breeding there has not yet been confirmed. The largest breeding concentration is located in the Rdum tal-Madonna area on the northeastern part of Malta, where the population has been estimated at around 500 pairs, possibly more. An accessible part was estimated to hold about 250 pairs (Sultana *et al.* 1975).

The Levantine Shearwater was noted as most common on Comino and Gozo (Schembri 1843). No large concentrations have been found on Gozo although its distribution is wider than that of *C. diomedea*. Birds have been observed along the southern cliffs from Mgarr ix-Xini to Ta' Cenc, at Is-Sanap, from Xlendi to Wardija Pt., and from Dwejra to San Dimitri Point. Breeding has been confirmed in all of these sites. On the northern coast, where the Cory's Shearwater is absent, the Levantine Shearwater was found breeding in natural crevices between Marsalforn and Ramla Bay and between San Blass and Wied ir-Rihan. Evidence of birds visiting narrow crevices on Fungus Rock was noted in spring 2001. The population breeding between Mgarr ix-Xini and San Dimitri is estimated to be in excess of 500 pairs. Some 50-80 pairs breed on the northern cliffs.

Breeding on Comino was mentioned by Schembri (1843), but Roberts (1954) doubted the species' presence on Comino. Breeding there was confirmed by Sultana & Gauci (1982) who also found birds breeding on Cominotto in 1970. From a number of visits carried out by the authors between 1990 and 1998, signs of breeding were found in six areas, while flying birds were noted in front of two deep caves. During a visit to Cominotto in late spring 1995, two chicks, one of which had been killed by rats *Rattus sp.*, were found. Along the same ledge, about ten entrances to nesting chambers were identified. The number of breeding pairs on Comino and Cominotto is estimated to be in the figure of 50-80 pairs.

Becher (1884) found this Shearwater breeding on Filfla in some numbers in a very restricted area. H.L.C. (1953) stated that he found it breeding under a tangle of growth at the foot of the cliffs. The colony on Filfla was noted to be declining by Sultana & Gauci (1970) when only three pairs were found. They did not exclude the possibility of other birds present deep within the debris. Since at least the early 1980's, this bird was noted to be absent from Filfla. It is worth noting that because of adverse weather conditions visits to Filfla are usually carried out between the end of May and early September.

European Storm-petrel *Hydrobates pelagicus melitensis*

The European Storm-petrel is a very common localised breeding visitor, breeding in very large numbers in the boulder and rubble screes of Filfla (Sultana & Gauci 1970,1982). It has recently been discovered breeding in a cave in Gozo (Borg & Sultana 1992-94). It makes landfall by the end of February (Borg 1989), and it is assumed that egg laying occurs between late April and late June. On 12th May 2000, six birds were incubating while the egg could be felt ready to be laid with several females which were handled for ringing. A first year bird was picked up at Marsalforn Bay on 24th July 2000, while a two-day-old chick was found on 11th August 1995, and other downy unfledged chicks were still in the nest in mid-September 1995 (pers.obs.). Late fledging may take place in early October as reported elsewhere (Massa & Catalisano 1986, Iapichino & Massa 1989).

Schembri (1843) was informed that the European Storm-petrel does not breed on the south side of Malta, Gozo and Comino, but only on the island of Filfla. Wright (1864) noted the species to be sedentary, very common on the south side of the islands, and to be found breeding on Filfla. Despott (1916) was of the same opinion, but fifteen years later he (1932-34) noted that it was becoming rare on the mainland. Both Wright and Despott failed to give any locality on the mainland. Gibb (1951) recorded it as rather common, to be found breeding only on Filfla. During a visit to Filfla, H.L.C. (1953) described the colony as rather small, while Roberts (1954) noted that it had formerly been a common resident, but was now depleted in number. He found only two pairs on Filfla in June 1952. De Lucca (1969) listed it as an uncertain breeding resident, in small numbers and a summer breeding visitor in May. Sultana & Gauci (1970, 1982) estimated the colony at 10,000 pairs, but Massa & Sultana (1993) noted that numbers were on the decline. Present

estimates show that the number of breeding pairs on Filfla is between 5,000 and 8,000 pairs.

The European Storm-petrel has not yet been confirmed breeding on mainland Malta. Single birds have been observed during the summer months where a freshly dead bird and a live, calling bird were found at Ghar Lapsi, facing Filfla, on 29 August 1978. Sultana & Gauci (1982) suggested that these may have been recently fledged birds from Filfla. In recent years, single birds have been observed from the same locality. At least four birds were seen flying in front of a narrow deep cave between 1993-1995. Another bird was seen at sea in the early morning of 05 September 1994, coming from the direction of the southern cliffs of Malta. Other birds have been observed along the southern cliffs between 1983-1999 (pers. obs). Recently fledged birds have been found washed inshore along the southern coast of Malta.

The Gozitan historian, Canon Agius de Soldanis (1746) reports that he had found a "strange" bird breeding in a cave between Xlendi and Ta' Cenc (Gozo). From his description, the bird can be none other than *H. pelagicus*. This was the only observation of this bird from Gozo for over 200 years. In summer 1973 a long dead corpse was found in a cave at Ta' Cenc (Sultana & Gauci 1982). In 1994, a cave in the vicinity of the Ta' Cenc cliffs was found to harbour a small colony of this bird (Borg & Sultana 1992-94). From a number of visits in the years 1994-99, the population was found to be in excess of 25 pairs (pers. obs.). Single birds have also been observed during the night along the northwestern cliffs .

Conclusion

Information for determining changes in status is less than satisfactory, particularly for the cliff breeding shearwaters. The presence of mammalian predators such as feral cats and rats is highly detrimental to the health and stability of the colony. Disturbance by human visitors is also an ever increasing problem. Carefully designed and continuous studies of seabirds at specific locations may reveal long term trends in environmental conditions. Further data collection should be actively encouraged as this provides a continuous assessment of the relative abundance of these Procellariiformes

References:

Agius de Soldanis, G.P. 1746. *Il Gozo Antico-moderno e Sacro-profano Isola Mediterranea adiacente a Malta Africana*. National Library of Malta, Library MS 145.

Bannerman, D.A. & Vella-Gafliero, J. 1976. *Birds of the Maltese Archipelago*. Museums Dept. Valletta, Malta.

Becher, E.F. 1884. Shearwaters on the rock of Filfla. *Zoologist* (3) 8:467-468.

Borg, J. 1989. The Storm Petrel *Hydrobates pelagicus* in the Maltese Islands: A review. *Nat. Sicil.* S. IV. XIII (1-2):44-52.

Borg, J.J. 1999. Philopatry in Cory's Shearwater in the Maltese Islands. *Il-Merill* 29: 11-15.

Borg, J.J., Bonaccorsi, G. & Thibault, J-C. 1999. Note on the wintering of the Cory's Shearwater *Calonectris diomedea* in the Mediterranean. *Il-Merill* 29: 15-18.

Borg, J., Cachia Zammit, R. & Sultana, J. 1992-94. Predation by Yellow-Legged Gull *Larus cachinnans* on Storm Petrel *Hydrobates pelagicus* on Filfla. *Il-Merill* 28: 19-20.

Borg, J. & Cachia Zammit, R. 1986-87. Analysis of Yellow-legged Herring Gull Pellets from Filfla Island. *Il-Merill* 24:19-20.

Borg, J.J. & R. Cachia Zammit. 1998. In Walmsley, J., V. Goutnier, A. El Hili & J. Sultana (Eds.). Cory's Shearwater in a hostile environment: the Maltese Islands. *Ecologie des oiseaux marins et gestion intégrée du littoral en Mediterranée*. MEDMARAVIS Hammamet, Tunisia, 1996.

Borg, J. & Cachia Zammit, R. 1986-87. Arrival dates of Manx Shearwaters at colonies in Malta. *Il-Merill* 24: 15.

Borg, J. & Sultana, J. 1990-91. The present status of the Cory's Shearwater *Calonectris diomedea* on Filfla. *Il-Merill* 27: 15-16.

Borg, J. & Sultana, J. 1992-94. Storm Petrel *Hydrobates pelagicus* found breeding at Ta' Cenc, Gozo. *Il-Merill* 28: 23-24.

Borg, J.J., Sultana, J., Heidrich, P. & Wink, M.1999. First record of the Manx Shearwater *Puffinus p. puffinus* in Malta - Evidence from morphometric data and DNA analysis. *Il-Merill* 29: 18-20.

Borg, J.J., Sultana, J. & Coleiro, C. 2002. Pre-breeding movements and early land visits by the Levantine Shearwater in the Maltese Islands. *Il-Merill* 30: 20-23..

Borg, J. & Mallia, M. 1992-94. Cory's Shearwater *Calonectris diomedea* found breeding on the east coast of Malta. *Il-Merill* 28: 23.

Cachia Zammit, R. & Borg, J. 1986-87. Notes on the Breeding Biology of the Cory's Shearwater in the Maltese Islands. *Il-Merill* 24: 1-9

Cachia Zammit, R. & Borg, J. 1988. The Presence of a brood-patch in non-breeding Cory's Shearwaters *Calonectris diomedea*. *Il-Merill* 25: 11.

Cachia Zammit, R. & Borg, J. 1988. Cory's Shearwater *Calonectris diomedea* breeding in its second year. *Il-Merill* 25:11.

De Lucca, C. 1969. *A Revised Checklist to the Birds of the Maltese Islands*. Classey, Middlesex.

Despott, G. 1913. La Berta Maggiore del Mediterraneo *Puffinus kuhli* - Ciefa: Una specie che si estingue. *Arch. Mel.* (2) 13-16: 91-92.

Despott, G. 1916. The breeding birds of Malta. *Zoologist* (4) 20: 161-181

Despott, G. 1932-34. Ornitologia delle Isole Maltesi. *Riv. Ital. Orn.* (2) 2: 5-16, 65-77.

Gibb, J. 1951. The Birds of the Maltese Islands. *Ibis* 93: 109-127.
H.L.C. 1953. A visit to Filfla Island. *The Oologists' Record*, March 1953: 7-9.
Iapichino, C. & Massa, B. 1989. *The Birds of Sicily*. B.O.U. Checklist No. 11.
James, P.C. 1984. The Status and Conservation of Seabirds in the Mediterranean Sea. In Croxall, J.P., Evans, P. G. H. & Schreiber, R.W. *Status and Conservation of the World's Seabirds*. ICBP Technical Report No.2.
Massa, B. & Catalisano, A. 1986. Status and conservation of the Storm Petrel *Hydrobates pelagicus* in Sicily. In Med-MARAVIS & Monbailliu, X. *Mediterranean Marine Avifauna Population Studies and Conservation*. Springer-Verlag, Berlin Heidelberg New York London Paris Tokyo.
Massa, B. & J. Sultana. 1990-91. Status and Conservation of the Storm Petrel *Hydrobates pelagicus* in the Mediterranean. *Il-Merill* 27: 1-5.
Roberts, E.L. 1954. *The Birds of Malta*. Progress Press, Malta.
Schembri, A. 1843. *Catalago Ornitologico dell Gruppo di Malta*. Anglo-Maltese, Malta.
Sultana, J. 1986. Seabird conservation problems in the Maltese Islands. In MEDMARAVIS & Monbailliu, X. *Mediterranean Marine Avifauna Population Studies and Conservation*. Springer-Verlag, Berlin Heidelberg New York London Paris Tokyo.
Sultana, J., Gauci, C. & Beaman, M. 1975. *A Guide to the Birds of Malta*. Malta Ornithological Society, Malta.
Sultana, J. & C. Gauci. 1970. *Bird Studies on Filfla*. Malta Ornithological Society, Malta.
Sultana, J. & Gauci, C. 1982. *A New Guide to the Birds of Malta*. The Ornithological Society, Malta.
Sultana, J. & Cachia Zammit, R. 1988. Cory's Shearwater *Calonectris diomedea* breeding on Hagret il-General. *Il-Merill* 25: 12.
Thibault, J-C., Borg, J.J. & Ristow, D. 1996. Vergleich der Überlebenstrate zwischen drei Kolonien des Gelbschnabelsturmtauchers. *Deutsches See-und Küstenvogelkolloquium, Wilhelmshaven.*
Trail, H.A. 1949-50. Shearwaters on Filfola Island. *Sea Swallow* 3: 12-14.
Wright, C. 1863. A visit to the island of Filfla on the south coast of Malta. *Ibis* (20) 15: 432-440.
Wright, C. 1864. List of the birds observed in the Islands of Malta and Gozo. *Ibis* (1) 6: 42-73, 137-157.

John J. Borg – 13, The Catacombs, Rabat , RBT 07, Malta. diomedea@onvol.net
Joe Sultana – Dar Gajdoru/3, Gajdoru Street, Xaghra, Gozo XRA 104, Malta. jsultana@global.net.mt