NOTES ON THE BREEDING BIOLOGY OF THE CORY'S SHEARWATER IN THE MALTESE ISLANDS

RICHARD CACHIA ZAMMIT & JOHN BORG

The Cory's Shearwater Calonectris diomedea is a common breeding visitor to the Maltese Islands, nesting along suitable sea cliffs in Malta and Gozo, and on Filfla. The colony on Filfla breeds in cavities in boulder and rubble slopes, while other colonies are situated mainly along the south and south-western coasts of the islands in sheer cliff faces (Sultana & Gauci 1982). Due to their position it is very difficult to observe the birds at their nesting sites. However, a few accessible nesting areas can be reached in some of the colonies, and the following work was carried out in 16 such localities during the years 1985-1986. These sites vary from single accessible nests situated on the upper parts of cliffs, to whole ledges situated on cliff faces. Along these ledges there is a combination of boulders, crevices, caves and vegetated parts. Each area may hold from 1 to 10 accessible nests as well as other breeding pairs which nest in deeper crevices, making their observations impossible. Altogether an average of about 46 nests were under observation annually.

Method

Observations were carried out regularly (3 times weekly, on average), mainly at night, commencing from the last week of February up to the last week of October, thus covering the whole breeding period. Birds were ringed either as they entered the colonies, or on the nest in the case of accessible ones. All such nests were numbered in the first year of the study period and a record of the breeding success of each nest was kept in consecutive years. The adult birds of most accessible nests were paired each year to investigate whether any displacement in adult birds occurs. Birds were sexed according to bill's length, using the methodology of Ristow & Wink (1980). Pairing was carried out during the incubation period, so it was found out that nests may be occupied at other times by different birds which could be prospective breeders. In 1986, three nests at different sites were under daily observation during incubation. The sample number is low due to various reasons, including constant human activities near colonies as well as the difficulty of visiting the nest daily.

Breeding Sites

The south-western coastline of Malta consists mainly of continuous cliffs stretching for about 25km, while almost 12km of cliffs make up the south-western coast of Gozo. In most of these areas the cliffs are 'bunny-reced' with caves, cracks, fissures, and crevices found at various heights and offering ideal nesting sites for shearwaters. In such areas the cliff ledges tend to be vegetated. Few plant species are to be found, but usually those grow into considerable clumps and bushes. Scorzonera maritima is the dominating plant, growing in thick bushes, while Centaurea splendida grows in large clumps in some areas. Capsisaurus crassifolia is also well distributed. In some places, large boulders and debris collected beneath boulders as well as on cliff ledges, increasing the availability of nesting sites. On the other hand, some cliff faces are very smooth, devoid of crevices or ledges and with little, if any, vegetation.

While in Crete nests are scattered throughout gently sloping areas and around the top of the less sheer parts of the cliff (Round & Swann 1976), most Cory's Shearwaters in the Maltese Islands nest along vertical cliffs. The majority use natural holes and crevices as nesting sites (see table 1), breeding in every suitable place, from large caves to single small holes and from sea-level up to 130m. This was also the case for nests found on the islands in the Marseille area, where 60% of those examined were in natural crevices (Fernandez 1983). Birds nesting in natural holes as well as some boulders and slabs are also found in Crete (Round & Swann 1976). Cory's Shearwaters breed amongst boulders as readily as they would in natural holes or crevices. On Filfla almost all breeding pairs are to be found nesting beneath boulders and the tons of debris which cover its sloped base (Sultana & Gauci 1970). The only reason why nests amongst boulders figure less prominently than
On Great Salve in the Atlantic, where G. t. borealis breeds, any crevice or hole of sufficient size can shelter a nest. Ruined human habitations are also used, while on the plateau the shearwaters themselves sometimes excavate actual burrows in the soft earth (Roux & Jouanin 1968), while some have also been noted in use rabbit holes (Jones 1986). From the nests examined in the Marseille area, 299 were found in self-excavated holes and 55 in rabbit burrows (Fernandez 1989), while in Greece no self-excavated burrows were noted (Roux & Swann 1976). In the Maltese islands, self-excavated burrows are necessarily few due to the rocky terrain where the Cory's Shearwaters breed (see Table 1). Rabbits occasionally burrow which are fairly common along the cliffs, rarely dig burrows for the same reason. Most self-excavated burrows found are merely depressions dug beneath boulders or stones. Where two or more burrows have been found and these were excavated in the soft earth produced by the weathering of the rocks and which sometimes accumulates on cliff ledges in appreciable amounts. On Filfla only one self-excavated burrow was located and this was in waste ground (Sultana & Gauci 1979). No nests have been found in rabbit burrows.

A good proportion of the large colony found on Linosa, in the Sicilian Channel, nests beneath scrub which covers a large part of the breeding area. Here, birds nest amongst thick bushes covered in the plant, but a good number use only the denser vegetation as a nesting site (Nessa, pers. comm.). In the Marseille area, nests under vegetation ranged from 1.5m to 3m deep. This is rather surprising, as many areas with thick vegetation are available, especially on cliff ledges. The few birds found nesting under vegetation had their nests deep. In the Maltese islands, self-excavated nests are few because they are now vulnerable to human interference and to predation, especially from rats and cats. This is common in cliff areas. However, the few known nests beneath vegetation were always successful during the study period. Some nests were located in a platform of boulders. After breeding successfully in 1983, the nest was abandoned the year after due to human disturbance.

Nests on Linosa were at least 10m underground (Vaughan 1980). In the Marseille area, Fernandez (1988) found an incubating bird 12m deep in a narrow crevice. On Great Salve any crevice or hole of sufficient size can shelter a nest, sometimes the hole is large enough for the sun to penetrate or for several birds to take up their abode (Roux & Jouanin 1968).

In the Maltese Islands, incubating birds were found from a few centimetres inside burrows/crevices - exposed to daylight - up to 8.5m in constant darkness. Other birds were breeding inside burrows/crevices whose depth could not be estimated. On Filfla, Sultana & Gauci (1970) found some incubating birds barely 30cm from the entrance, exposed to daylight, while others were as deep as 4m. One pair laid the egg only 20cm from the entrance. This nest was used only once during the study period as the egg failed to hatch and was later abandoned.

Some sites have communal entrances. In one area, up to six pairs were noted entering a small hole which led into different chambers. In some areas, a few nests were in close proximity of each other. At two colonies in 1980, birds were seen sharing the same entrance with Mac Shearwaters Puffinus puffinus. Sultana & Gauci (1970) found them breeding close to Storm Petrels Hydrobates pelagicus on Filfla.

**Nest Structure**

No actual nest is built, but many Cory's Shearwaters use various articles to 'decorate' the nest. Most lay the egg on the bare soft earth. Feathers have been noted in nests mainly at the time of egg laying and are probably produced by the formation of the broad patch of the incubating birds. Plant matter is sometimes also used. On the Great Salve they frequently decorate the nest with pebbles, shells, bones or vegetable debris (Roux & Jouanin 1968). In Malta a part shot through the nest was 3m deep. In places where small stones are to be found, these are placed at the fringes of the nest, close to each other. This behaviour was also noted on Linosa (pers. obs.). The north Atlantic subspecies G. t. borealis of small stones in the Berlanga islands off the Portuguese coast. In the Great Salve it was noted that when the ground slopes steeply, the building of a platform of pebbles assures a horizontal surface for incubation (Jouanin & Roux 1966). It is not entirely necessary that the shearwaters use stones only to make a horizontal surface, as both in Malta and on Linosa the ground where nests were located was not flat, and nests were 3m deep at Malta. It was noted that nests which were found on soft ground had a sort of depression. This is done by the continuous scraping of the incubating bird, prior to and after egg laying, and in consequence a mound is formed at the entrance of the nest. This mound gives the impression that no nest is in evidence. At this town, however, a nest was found at an elevation. At this nests these depressions occur, it is sometimes almost impossible to see the incubating bird and later in the breeding season it is impossible to see the chick until it reaches a certain age.

### Table 1: Nesting sites used

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample number</th>
<th>Natural holes</th>
<th>Amongst boulders</th>
<th>Beneath vegetation</th>
<th>Self excavated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>41</td>
<td>68</td>
<td>15</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>1984</td>
<td>36</td>
<td>55</td>
<td>15</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>1985</td>
<td>54</td>
<td>55</td>
<td>25</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>1986</td>
<td>32</td>
<td>55</td>
<td>25</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

| Mean | 54.5 | 26 | 15 | 5 | 11 |

### Table 2: Fidelity to site and mate

<table>
<thead>
<tr>
<th>Year</th>
<th>No. in sample</th>
<th>% return to same site</th>
<th>No. returns</th>
<th>No. disappers</th>
<th>No. moves</th>
<th>No. others</th>
<th>% dis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>18</td>
<td>78</td>
<td>5.5</td>
<td>12</td>
<td>13</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1984</td>
<td>24</td>
<td>71</td>
<td>13</td>
<td>5.5</td>
<td>13</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>1985</td>
<td>23</td>
<td>65</td>
<td>13</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

The mean percentage of the sample in which both adults returned to the same site is 71%. In most cases there was no evidence of incompatibility between pairs of which one of the birds was substituted in the following years. So it would seem that the changing of a partner was mainly due to death. In the majority of cases the remaining bird managed to find a partner and breed in the same nest while in a few instances the remaining bird moved to another nest in the vicinity. At one study area in 1983, two pairs (pair A Male: FF00347, Female: FF00302 and pair B Male: FF00265, Female: FF00262) bred successfully in natural cavities about 1m from each other. In 1984, the same pairs were again breeding at the same sites. However during incubation, pair A was disturbed by white pair B bred successfully again in 1985 only the male of pair A (FF00347) turned up at its nesting site while the female of pair B (FF00262) was retired, also in its corresponding nesting site. The male of pair A continued to visit the site up to the beginning of May. On visitation of pair B during incubation, the nest of pair A was found to be in the same area, the nest in the nest of pair B was made up of the original female of pair B (FF00262) and the male of pair A (FF00347) and they bred successfully in that year as well as in 1986.
Egg laying

Sultane & Gauzi (1982) give the laying period as being from mid-May to mid-June. However, during the four-year study period carried out by the present writers, no eggs were laid before 24 May and none after 1 June. Sultane & Gauzi (1970) found an incubating bird at Filfla on 18 May 1969, but this could have been an exception. Egg laying in shearwater colonies is highly synchronized and all were found to lay in the last week of May, with peak days on 27-28 May.

Incubation

During 1986, the incubation period of 3 pairs at different areas was recorded daily, except for one day each. In all three cases, the male took over the first incubation spell immediately during the first night after egg laying. This was also evident in other nests. The immediate taking over by the male for the first incubation period has been noted by Zino (1971) on the Salve Islands, where in the majority of cases (88% of sample), the male was found incubating within 24 hours of laying.

In incubation periods of the three above-mentioned nests was of 52 days each, laying day inclusive. There was no appreciable difference between the total duration of incubation by males and that by females (see Table 3). Zino (1971) gives a mean 52.8 days for the incubation period of the Cory’s Shearwater on the Salve Islands.

TABLE 3: Analysis of 3 nests during incubation

<table>
<thead>
<tr>
<th></th>
<th>MALE</th>
<th>FEMALE</th>
<th>NEST NOT VISITED</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>36 days</td>
<td>21 days</td>
<td>1 day</td>
<td>52 days</td>
</tr>
<tr>
<td>Pair 2</td>
<td>23 days</td>
<td>28 days</td>
<td>1 day</td>
<td>52 days</td>
</tr>
<tr>
<td>Pair 3</td>
<td>21 days</td>
<td>50 days</td>
<td>1 day</td>
<td>52 days</td>
</tr>
<tr>
<td>Mean</td>
<td>24.7 days</td>
<td>26.3 days</td>
<td></td>
<td>52 days</td>
</tr>
</tbody>
</table>

Wink et al. (1982) give the average incubation spells of birds in the Kegan as 6.1 days for males and 5.2 days for females, and Zino (1971) gives an average of 6 days for both sexes from the Salve Islands. In Malta a total of 31 change-overs was noted amongst the three pairs under daily observation. The incubation spells of males lasted from 1-9 days with a mean of 4.6 and a standard deviation of ± 2.49 days, and for females, from 1-10 days with a mean of 4.8 and a standard deviation of ± 2.27 days. Change-overs were more frequent during the last days of incubation (see Fig. 1).

In 1982 an unexplained occurrence was noted in a particular nest where 3 individual birds were found incubating the same egg. On 11 June a female (FF03454) was found incubating underneath a boulder. Two days later the male (FF03548) was sitting on the egg. However on 27 June a new female (FF03571) was found incubating the same egg. The egg hatched and the young fledged successfully. The male (FF03454) and the second female (FF03557) continued to breed successfully in the same nest for the following three years, while the first female (FF03548) was never seen again until two years later, when it was caught at night entering a deep hole about 7m below the original nest. It was caught again in 1986 entering the same hole, Harris (1969a) recounts a similar occurrence on Skokholm island where three pairs of Shearwaters, 12 males and a female, were found occupying the same nest in which two eggs were laid. In this case the female might have had different males for the two eggs laid, whereas in the case of the Cory’s Shearwaters there was no evidence that a second egg was laid. On 16 August 1983, a female was found in a nest during the day, still incubating an egg which never hatched.

Feeding of young birds

Vaughan (1980) gives a detailed account of the feeding of young birds by parents. While on a visit to Linoa, he observed that the adult feeding is a lengthy affair. At first, the adult spends most of the time just sitting by the chick inactively. During the feed, the chick begins to point its bill towards the adult, later developing into a violent, almost frenzied notion of pecking and nibbling at the parent’s head and bill. These peckings are part of a rhythmical thrashing head and bill which appears to become frantic. The adult responds in a similar behaviour followed by the opening of the bill, when the chick thrusts its bill inside it, getting more or less liquid rather than solid regurgitations. After the feed, both birds’ heads down and close together for a short time. During the entire feed, the chick keeps calling, with the cries rising to a crescendo during the actual feeding. This operation takes a minute or so and is followed by a pause, it is then repeated several times. The whole feed occupies 15-20 minutes. When it is over the chick subsides into inactivity and falls asleep. Similar behaviour was observed by the authors, at colonies in the Maltese islands.

Vaughan (1980) also questions the possibility that this feeding method may change as the young bird grows, until fledging time, as he quotes observations carried out by Barnett & Vella-Gaffiero (1976), who stated that in a colony in Malta, they found 4 young Horse-Mackerel Trachurus trachurus “fresh enough to have been taken the night before and still untouched by the young”. Sultane & Gauzi (1982) record these observations as puzzling and misleading, as they found that regurgitated food is given up to the time the adult ceases feeding their young. Observations carried out by the present authors, at colonies in the Maltese islands, also confirm this as this method of feeding was noted up to a few days before fledging. Barnett & Vella-Gaffiero (1976) mention young mulleti Mudg 1p sp., as food given to chicks. This is also puzzling as from a number of regurgitations analysed by the authors the contents included Squis ZoZop vulgatius, Anchovies Enagrauis anbrasatus, Flying-fish Cypho­ampus rostratus and Horse-Mackerel, but no sign of Mudg 1p sp. Sara (1989), also mentions Eols Lagoeco cephalus and young sharks up to 15cm long, as taken by this shearwater, along with other species of fish. He also noted no Mudg 1p sp. in the regurgitations he analysed. All Mudg 1p species are to be found in shallow waters and close to shore (Lythe­me & Lythgoe 1971) and Cory’s Shearwaters have always been observed feeding out at sea at least 3-4km offshore.

Breeding Success

On the Great Salve, Zino (1971) found that 30 out of 42 eggs hatched, i.e., 71% of the eggs laid. 13% of the eggs laid were taken by Yellow-legged Gulls Larus michahemnus which constantly patrols the breeding areas and take the exposed unhatched eggs.

In the study areas in the Maltese Islands, the mean hatching success was 80%. Although a few pairs of Yellow-legged Gulls Larus michahemnus still breed along the cliffs of Malta and Gozo, no predation of eggs was noted to have taken place by these birds. Newly hatched eggs were found abandoned and examination were found to be alloded. In 3 cases the eggs, which were found broken, were sticking firmly to the underside of the incubating birds. In some cases, pairs which had bred successfully together in previous years

TABLE 4: Breeding success

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample No.</th>
<th>Unhatched eggs</th>
<th>Unfledged puli</th>
<th>Successful fledging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>40</td>
<td>27</td>
<td>5</td>
<td>68</td>
</tr>
<tr>
<td>1984</td>
<td>40</td>
<td>36</td>
<td>8.5</td>
<td>85</td>
</tr>
<tr>
<td>1985</td>
<td>52</td>
<td>23</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>1986</td>
<td>55</td>
<td>22</td>
<td>9</td>
<td>95</td>
</tr>
<tr>
<td>Mean</td>
<td>40</td>
<td>20</td>
<td>8</td>
<td>72</td>
</tr>
</tbody>
</table>
failed to hatch the egg in a particular year. Usually this coincided with the total disappearance of one of the birds, probably due to death. Most of the chicks which did not fledge, died in the first two weeks after hatching. At this time they are still quite small, and rely on the parent alone. Thus, in 1986, in one study area all five known chicks were found dead or missing at the same time. One of the nests was in aner in the same tree and although the chick could not be found, it was found dead at the crevice's entrance. This could have been the work of a Ferret (Mustela putoriusfuro) which is still used by a few people for hunting rabbits. In some cases the chick died later in the breeding season but again this was often the result of the disappearance of one of the adults.

**Survival of Adults**

In 1983, 49 incubating birds were ringed on the nest at different study areas. Many were retrapped in the following years while at the same time other breeding birds were ringed. Each year a constant effort to pair breeding birds was made with frequent visits to the study areas during the incubation period, and very few birds were missed. Still the figures in Table 5 can be considered as minimal as there is always the possibility that some birds may have been alive elsewhere.

**TABLE 5: Adult Survival of Cory's Shearwaters between 1983 and 1986**

<table>
<thead>
<tr>
<th>Year</th>
<th>Breeding birds marked in year</th>
<th>Breeding birds alive in year (X+1)</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>65</td>
<td>41</td>
<td>63.7</td>
</tr>
<tr>
<td>1984</td>
<td>65</td>
<td>54</td>
<td>83.1</td>
</tr>
<tr>
<td>1985</td>
<td>63</td>
<td>45</td>
<td>71.4</td>
</tr>
</tbody>
</table>

The mean survival turns out to be 79.4% which is very low for a seabird, Bliss et al. (1980) study on Cory's Shearwaters in 1984, 1986, 1987 and 1989, also covering a period of four years. The survival for the first year was 87.5%, for the second 85.8% and for the other years 83.5% giving an average survival of about 85%. This is negatively 9% higher than that for the Maltese Islands. Adult survival has been studied in many other Procellariiformes, of which all gave a survival rate of 95% or over (Nelson 1991). The reason why the survival of adult Cory's Shearwaters in the Maltese Islands is so low can be attributed to direct human persecution. One has to consider that this study is based on somewhat accessible areas of colonies, and though difficult it might be, some persons, especially fishing enthusiasts manage to access to these areas. During all four years of the study, several birds were found killed in such areas and many nests were found disturbed. Some fishermen, kill the birds to take some feathers from the under-wing to use as fishing tackle, while considerable numbers of shearwaters are shot off sex-rafts for fun. Sultana & Gauci (1982) remark that the numbers shot every summer must be considerable. Indeed when one considers that shooters do not kill one bird per year, but shoot random, killing also non-breeders, and considering that in a colony these non-breeders are usually by far more numerous then the breeding birds (Araujo & Lockey 1985, also non-breeders can be found in the colonies almost throughout the whole breeding season, though numbers have never been estimated. They are less evident as the breeding season approaches the end. The latest data was of 3 birds retracted on 14 October. The bird's bleached plumage excluded the possibility of it being a fully plumaged fledgling, while its behaviour was that of a non-breeder.

**Non-breeders**

Vaughan (1980) records large numbers of non-breeders present each night in the colony on the island of Linosa during the time he was there (8-16 Aug, 1978). Massa & Lo Vico (1986) calculate the population of non-breeders for the same colony as being about 50% of the adults. Similarly, in the Aegean, that during the incubation period as well as during the first week after the chicks hatch, one can regularly see that there were 5-10 more shearwaters in the nest area than there were eggs. It was supposed that the majority were non-breeders. The number of non-breeders visiting the Cabrera Archipelago in summer was even higher as it was estimated as being approximately three times the number of breeding adult (Araujo et al., 1976). On the other hand Round & Swann (1976) did not identify any non-breeders. In the vicinity of the colony they studied in Croatia from 17 July-4 Aug and from 27 Aug-24 Oct 1974, in the Maltese Islands, non-breeders can be found in the colonies almost throughout the whole breeding season, though numbers have never been estimated. They are less evident as the breeding season approaches the end. The latest data was of 3 birds retracted on 14 October. The non-breeders numbers are usually by far more numerous then the breeding birds (Araujo & Lockey 1985, also note that in Malta, non-breeders still have not been identified. Some non-breeders are known to form pairs. Paired non-breeders may be found courting from a given area, being visited by a pair of breeding birds, which had been trapped in recent years. However, the following year these birds would have matured ready to breed but were hindered from doing so by the lack of a suitable breeding site. It is not known when these birds were trapped, but they were ringed during the pre-breeding period, (in the case of the Cory's Shearwater from March to mid-May), to strengthen banding by staying for long periods at the nest site. This clearly explains why every year a few breeding and non-breeders were established later in the season. These birds spend a lot of time courting. This gives the birds an advantage, as in the forth-
crowning they can devote more time to continue to strengthen the pair-bond, which is so important for successful breeding, instead of spending a lot of time and energy to find a mate and build up a pair-bond.

Sometimes paired non-breeders or prospective breeders, may be found courting in nest sites that are known to be occupied by other pairs. This is evident during the pre-breeding period when the colony is in a somewhat confused state, with new birds trying to establish themselves in the colony or in the case of unpaired, trying to find a mate. Some of these birds which were found courting in established nest sites, were later in the year found breeding in different nest holes and also with different partners.

On 21 March 1985, two birds (Male: FF00706 and female: FF00705) were found courting during the day in a nest hole which had been used successfully by another pair (Male: FF00597 and female: FF00560) for at least two years. At night the old male (FF00597) arrived and entered the nest. After a short quarrel, one of the birds flew out of the nest hole. On inspecting the nest, the old male (FF00597) was found to be still there, but the other remaining bird was out of reach, and so it was impossible to determine which bird of the newly formed pair, actually left. After that day, only the old pair (FF00097 and FF00060) was found in the nest hole and again bred successfully. However, the year after, the old pair disappeared completely and their place was taken over by the new pair (FF00706 and FF00705) which eventually bred there, although without success.

In many procellarids, the cause of noisy skirmishes, is the visiting of occupied burrows by unattached birds, including newcomers to the colony (Nelson 1980). Although short quarrels are quite a frequent event in Cory’s Shearwater colonies, especially in the pre-breeding stage, only once a real fight between two birds was witnessed. At the place of the fight after being attracted by loud screams, two birds entangled together were seen tumbling down the cliff. The fighting birds could still be heard screaming as they dropped down to the sea.

Acknowledgements

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IMPROVED DECISION MAKING BY MIGRATING DIURNAL RAPTORS DURING MORE INTENSE MIGRATION

MARTIN A. THAKE

The possibility that decisions made by flocks of animals, including birds, might be the product of a conscious was first stated explicitly by Lorenz (1952), but his comment did not elicit any research effort, although Gompper (1976) saw also Drury (et al. 1982) had shown that majority decision making should lead to distinct statistical advantages. There is every reason to believe that majority decision making could evolve in natural populations (Thake 1984-1985).

In this paper, positive correlation is demonstrated between the accuracy of a decision to migrate made by certain raptores, and the total number of raptores on migration at the time.

METHODS

The data used in this paper were obtained during visual watches maintained at Buskett during the spring of 1977-78, for details of the observation methods, the reader is referred to earlier papers (Thake 1977, 1980). Although the period and duration of observation varied slightly from year to year, coverage during September of any year was usually the same, and data for this month alone were used in the calculations.

Details of local weather were recorded at hourly intervals, Additional data were obtained from the records of the meteorological stations at Luqa and Brand, Regional weather charts were supplied by the Deutscher Wetterdienst and the Hellenic National Meteorological Service.

RESULTS

All calculations were performed on a Casio FX 8210 programmable calculator, using ad hoc computer programs devised and tested by the present author.

Wing strength data recorded at hourly intervals at Buskett were used to calculate the mean wind strength during a given watch. Natches were scored for suitability of migration conditions on the basis of wind strength alone. "Good" conditions were considered to have prevailed on days when mean wind strength during a watch was less than 10 knots, while "Brad" conditions were characterised by a mean wind strength of more than 10 knots. Data for September of each year were tabulated by date, forming the raw data for the analyses which followed.
Data for each date were grouped, and the fraction of individual birds of each species migrating during 'Bad' conditions calculated as a fraction of the total number of individuals migrating over Buskett on that date over three years. The correlation of this fraction with the total number of individuals migrating on that date was investigated graphically, and by calculating a correlation coefficient. Data for the three species were then combined, and the analyses performed for all three species together. The results of these analyses are tabulated in Table 1.

**TABLE 1 : Correlation of the fraction of individuals migrating during 'Bad' conditions with the total number of individuals sighted. Data for single dates analysed individually.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Correlation Coefficient</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honey Buzzard</td>
<td>-0.3172**</td>
<td>30</td>
</tr>
<tr>
<td>Hobby</td>
<td>-0.5555**</td>
<td>25</td>
</tr>
<tr>
<td>Marsh Harrier</td>
<td>-0.2541*</td>
<td>25</td>
</tr>
<tr>
<td>All species</td>
<td>-0.5256***</td>
<td>30</td>
</tr>
</tbody>
</table>

*** p < .01
** .05 < p < .10
* .01 < p

The data were next grouped in periods spanning five dates (e.g. 1st to 5th September; a total of 15 days over three years), and the proportion of birds migrating under each of the two weather categories was calculated for all three years together. The total number of birds seen during this period was also calculated. Linear correlation coefficients were determined for the variation of the fraction of individuals migrating during 'Bad' conditions with the total number migrating during the period in question. In addition, the number of birds migrating during both types of condition, and the ratio of the mean number seen per day for each weather category were calculated. Correlation coefficients were calculated for variation of this quantity with the total number of birds migrating during the period in question. The results of these analyses are presented in Table 2.

**TABLE 2 : Correlation of the fraction of individuals migrating during 'Bad' conditions with the total number of individuals sighted. Data grouped in intervals spanning five dates (see text).**

<table>
<thead>
<tr>
<th>Species</th>
<th>Fraction in 'Bad'</th>
<th>Mean no. in 'Bad'</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple</td>
<td>Rank</td>
<td>Simple</td>
</tr>
<tr>
<td>Honey Buzzard</td>
<td>-0.9359**</td>
<td>-0.9857**</td>
<td>-0.8116**</td>
</tr>
<tr>
<td>Hobby</td>
<td>-0.715</td>
<td>0.7</td>
<td>-0.3682</td>
</tr>
<tr>
<td>Marsh Harrier</td>
<td>-0.3698</td>
<td>-0.3</td>
<td>-0.5077</td>
</tr>
<tr>
<td>All species</td>
<td>-0.9160***</td>
<td>-0.8897**</td>
<td>-0.8006**</td>
</tr>
</tbody>
</table>

** .01 < p < .05
*** p < .01

A further analysis was performed using the same data. The total proportion of birds seen during 'Bad' conditions during the first n date periods to produce a 'n date moving proportion'. The calculation was performed for n = 1 to n = 25. Correlation between this quantity and the total number of birds seen during the period in question, was investigated for each value of n. Again the analyses were performed for each species in turn, and on all three species combined to produce Figure 1.

Sightings of flocks of Honey Buzzard Pernis apivorus were analysed for randomness as follows. Only data collected between 1200 and 1800 CET were used in the analyses. The number of Honey Buzzards migrating over Buskett during this period varied little with time of day during the study period (these 1981, Data for the last ten days in September 1976, when weather over Malta was anticyclonic and varied little from day to day, were stored on computer tape. These data were sampled using intervals of variable duration to deter-
the most suitable sampling interval for detecting patchiness (see Figure 2). A shorter interval having a high coefficient of dispersion (the sixty minute interval) was selected for field trials, see Sekal & Rohlf 1989. Data for the entire study period was then used to extract two sets of data for low and for high migration intensity (3 to 6 birds/sight during each six hour period versus 24 to 39 during high migration intensity). These two sets of data were then analysed separately using a sixty minute sampling interval. The results are tabulated in Table 3.

Table 4 lists the numbers of flocks of various sizes which were seen during 'Bad' and 'Good' conditions respectively.

**TABLE 3**: Analysis of Honey Buzzard sightings for randomness.

<table>
<thead>
<tr>
<th>Number of Flocks per Interval</th>
<th>Intensity of Migration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
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<tr>
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<td>12</td>
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<td>14</td>
<td>0</td>
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<tr>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
</tr>
</tbody>
</table>

Poisson fit: Chi-squared = 21.59, p < 0.01

None of the proportions differ significantly (p > .10). Various combinations of flock size were tested for significant differences. No significant differences were found.

**TABLE 4**: Sightings of flocks of various sizes during weather belonging to each of the two classes.

<table>
<thead>
<tr>
<th>Flock size</th>
<th>Number in 'Bad' weather</th>
<th>Number in 'Good' weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>6</td>
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<tr>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

None of the proportions differ significantly (p > .10). Various combinations of flock size were tested for significant differences. No significant differences were found.

Discussion

Honey Buzzards, Buskett, has been used as a watch point for studying raptor migration since 1966 (Flake 1966, Al-Rashid 1967). The general features of raptor migration through the islands are well known. Honey Buzzards (Flake 1977, 1981), Marsh Harriers Circus aeruginosus (Flake 1968) and Hobby Falco subbuteo (Thake 1976a) leave Sicily during anticyclonic weather when wind strength is low in the early morning hours. Honey Buzzards pass over Buskett throughout the day, apparently to hunt small passerines (Thake 1981). Unlike Buzzards, Marsh Harriers converge on Buskett in the late afternoon, and Honey Buzzards usually attempt to roost there (Birke, 1975).

A leading line effect due to southwesterly gales is the major feature of migration at Buskett, and the same is true for Malta. Migration of the kestrel Falco tinnunculus through the islands follows a rather different pattern (Thake 1981). The species is not considered in this paper.

Consider the following hypothetical situation. On a given day, there are a number of migrants present in Sicily deciding whether to stay or to move to Malta. It is not to be considered whether to cross over the sea or to stay on the island. Weather conditions are 'Bad' but some cross nevertheless. The ones which remain are reinforced by new arrivals and decide again on the following day. In such a situation, the number of birds on migration provides an index of the degree of socialisation with which the birds may experience before deciding whether to migrate. The various analyses summarised in Table 1 and 2 utilise modifications of this index.

The correlations reported in Tables 1 and 2 clearly indicate a relationship between the accuracy of decision making and the number of birds on migration at the time. The relationship was present in all species examined but only received significance in the Honey Buzzard (the most numerous species), and when the totals of all three species were combined.

The correlation coefficients calculated for the 'in date moving proportion' show a strong tendency to become more negative as the length of the moving interval employed increases (Figure 1). This suggests that a source of variance is being removed when data from contiguous dates are combined.

The graphs for flocks of size 2 and 4 in Figure 1 (Line 3), and the results listed in Table 4 strongly suggest that the accuracy of decision making is not being influenced principally by flock size as recorded at Buskett. Previous studies (Thake 1980) had shown that flocks were large and could not represent the unit which had originally made the decision to migrate.

There are three principal ways in which social decision making might operate. (1) The behaviour of superior decision makers might serve as a model for other birds. Experienced adults should be superior decision makers to first autumn birds and a hierarchy of experience to ensure that information about their environment with other flock members, and then decide individually on the basis of an improved knowledge. (3) Birds might evaluate the intentions of other birds and decide on a simple majority basis.

The data available do not allow one to decide confidently which of these methods is being employed by the birds. Indeed, they are not mutually exclusive, and various combinations of the principal methods are conceivable. Nevertheless, it is clear from the data that differences in the accuracy of decision making between many different migration periods were in evidence during the study period.

Although there are no clear records to date which show that social decision making is advantageous, animals have frequently been observed performing some type of behaviour simultaneously (Birke 1974, Colgan et al. 1975, Dauphine & McClure 1974, Dauphine 1979, Kleinost et al. 1982, Kramer & Geier 1975, Mattiello 1976, Melvyn & Shaw 1975, Rickman 1979, atmkinson 1973, Siefried et al. 1975, Velds & Weidmann & Darley 1971). There is evidence that communication is taking place in at least some of these instances (e.g. Dillian 1979, Schmitz 1975, Siegfried et al. 1975, Walker 1961). Much of the extensive literature on socially facilitated behaviour is relevant to this topic. McClure (1978) provides a recent review of this subject. The investigation of social decision making in animals remains a promising and virgin field of research.

**Summary**

Previous studies had shown that Honey Buzzards Pernis apivorus, Marsh Harrier Circus aeruginosus, and Hobby Falco subbuteo have the same crossing from Sicily to North Africa via Malta during anticyclonic weather. Such behaviour minimises the risk of encountering bad weather while over the sea. Low wind strength is the weather factor which allows the best predictions and daily totals of migration. The data were analysed to determine the relationship between the accuracy of decision making and the number of individuals migrating on migration. The fraction of individuals migrating during bad weather (winds stronger than 10 knots) during intervals of 5 and 15 days (over 3 years) was estimated.
was negatively correlated with the total number of birds seen during that interval. This relationship was present in all three species, but only reached significance ($r = -.6052; p < .051$) in the Honey Buzzard, and when data for all three species were combined ($r = -.91$). There was no relationship between the accuracy of decision making and flock size, but flocks are labile, and do not necessarily represent the units which made the decision to migrate. The results might have observed another's migratory behaviour at a lower degree of the distribution of flocks during high migration intensity, which would facilitate this. The occurrence of decision making of better quality when many birds were on migration simultaneously was a strong indication that some form of social decision making was taking place.

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SHORT NOTES

ARRIVAL DATES OF MANX SHEARWATERS AT COLONIES IN MALTA

The Manx Shearwater Puffinus puffinus is the commonest shearwater in the western Palearctic, with two sub-species being found in the Mediterranean, the Puffinus p. aurea (Mauritania) and the Puffinus p. geocola (the eastern Mediterranean, including the Maltese Islands). The Manx Shearwater is a common breeding visitor to the Malta Islands.

Sultana & Gauci (1982) record that birds start arriving at their colonies from February, Manx Shearwaters have never been recorded locally. In the months of November and December, until five were seen off the west coast on 31 December 1974 (Gaul & Sultana, 1975). Prior to this date there had been only one sighting between August and February. This dearth of records was probably due to the lack of sea watching. Forty-three birds were counted in one afternoon off the northern tip of Malta on the 24 November 1976 (Sultana & Gauci 1982). Single birds were noted flying off the south coast of Malta, near Filfla, during December and January in recent years (pers. obs.). As sightings of this shearwater increased during the early winter months, various visits were conducted to the largest breeding colony, situated in the northern part of Malta, to determine whether adult birds started visiting the colonies before January.

The first visit was made on 25 November 1983, when no signs of birds visiting colonies were found. On the second visit on 12 December, birds had already been ashore, as footprints were seen in front of many burrows. Visiting until after dark, we managed to catch one bird which had been ringed in previous years, which was seen, one was heard calling out at sea, in the following year we again went to the colony on 12 December when two were trapped. In 1985 we visited the colony on an earlier date, on 5 December. Footprints were seen in front of several nest holes, remaining until after dark we managed to catch one while another was seen flying close to the cliff. During these visits the weather was calm with clear skies and no moon, except for the night of 12 December 1983 which was calm but with an overcast sky and a light drizzle. A morning visit on 3 December 1985 revealed that birds had already been ashore as fresh footprints were found in front of some burrows.

We would like to thank all those persons, particularly John Attard Montalto, who accompanied us on our visits.

References


Martin A. Thake - 169, Fleur-de-Lys Road, B'Kara, Malta.
AN UNSUCCESSFUL BREEDING ATTEMPT BY THE HOUSE MARTIN

There are three previously documented records of House Martins Delichon urbica breeding in the Maltese Islands. The first dates back to June 1981 when two nests were built under the balcony of a building facing Mosta Church (Sultana J. & Gauci C. 1982). A New Guide to the Birds of Malta J. The second record was of a pair which built a nest beneath the clock on the right side of the Cathedral at Mdina in June 1982. That same year, in August, a pair of House Martins was found breeding on the island of Filfla (Sultana J. & Gauci C. 1981-03, House Martin - New Breeding Species for Malta, 24-Merill 2: 17-18).

On 17 June 1985 at 1508 hours C.E.T., one House Martin was noticed flying over the bus terminus at Valletta. It approached Elia Gate and entered into the left arch from the terminus's side. A closer look revealed that the bird had alighted in the saucer-shaped ice-cream part of a lantern hanging from the ceiling. A little later, the bird left the site, flying away over the ditch on the left side. The next day the bird was also seen. On 19 June one bird was seen entering the lantern. Before alighting it twittered and its partner was heard answering from inside. The house Martins were also present on 20th and 21 June, and on the morning of the 22nd both partners could be seen circling and feeding in the ditch on the right side. At frequent times the birds were observed landing on the ditch sides probably collecting material for the nest, consisting of dust from the eroded ditch sides. Single birds were then recorded on 25th and 28 June. On 4 July twittering was heard in the nest and one of the House Martins was seen on the lantern. The last time that the House Martins were recorded was on 8 July when one was seen entering the nest. Subsequent observations proved fruitless.

It is not known whether any eggs were laid and neither why the House Martins abandoned the area. The House Martins may have easily fallen victims to illegal shooting practised on the island. It is also possible that the House Martins found a more suitable place where to breed. In this respect, successful breeding in 1985 by the House Martin nests to be confirmed.

The author would like to thank the following persons for submitting their observations for the compilation of this note: S. Balzan, P. Barbato, J. Doublet, D. Cachia, D. Caruana, D. Cassar, D. Cauchi, P. Dechia Zammit, D. Coleiro, J. Doublet, V. Falzon, M. Grima, P. Portelli and J. Vella.

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Joseph M. Mangion

TWO INTERESTING BREEDING RECORDS DURING 1984

On 6 July 1984 an adult Woodchat Shrike Lanius senator was seen carrying food at Tal-Balil, limits of B'Kara. On visiting the same area on 10th both the male and the female were seen. On the following day an adult and two fully fledged young were seen perching on top of a Carob tree Ceratonia siliqua in the same area.

Chiffchaffs Fringilla coelebs are recorded every year in summer, mostly at Buskett. Females, caught for ringing in July and August, are often found with brood patches. On 22 July a family party was observed at Biedi Il-Lug. At least one adult and 3 fully fledged young were observed.

Raymond Galea

SARDINIAN WARBLEHP TRAPPED IN SPIDER'S WEB

On 24 August 1986 at Bied Il-Lug, Buskett, a female Sardinian Warbler Sylvia melanocephala was found trapped in an orb Spider's Agelops Johaeta web. The bird was hanging from its feet. As it was approached it fluttered its wings and escaped. This relatively large web was 30cm above the ground and the Sardinian Warbler was trapped at the lower part of it.

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NECTAR FEEDING BY CHIFFCHAFFS

The purpose of this short note is to amplify the information on nectar feeding by this species which was published in an earlier paper (Thakes, R.A. 1980, Nectar: a supplementary food source for wintering Chiffchaffs Phylloscopus collybita. Riv. Ital. Ornitol. 50: 167-168).

Part of the garden where the Chiffchaffs were observed is shown in Figure 1. Thick black lines are stone walls, three metres high at U. The larger flower beds are marked F. An avairy (A) housing various finches lies towards the end of the garden. The positions of Lapeyroussia cruciata plants are labelled L. The Ponsaiti Zygophylla pulcherrima plant was held in a large pot (P), three metres below the window (W) from which observations were made. The Ponsaiti plant was about two metres high. The garden (D) nearby contains orange trees Citrus aurantium on which Chiffchaffs frequently forage by plucking insects off the foliage.

Nectar feeding was first noted in 1977 and was observed during every subsequent winter until 1982, when the Ponsaiti died. Chiffchaffs were seen feeding on nectar during late afternoon, but observations were not made at other times, so birecords used.

Early in the season, the Ponsaiti was utilised exclusively. As many as three Chiffchaffs at once were observed perching on the wall at U, from whence they flew to the inflorescences. After alighting singly on the inflorescences, each bird was observed to insert its bill into the flower. Nectar visited the plant singly. As observations were made at very close range, 1 to 2m away from the birds behind a closed window, it could be ascertained that the birds were actually taking nectar, and not eating pollen or small insects attracted to the inflorescences. Nectar was seen dripping from the flowers. A bill or tongue movements were noted. Several short bouts, each about 1 second long, were made before the bird returned to its perch. Each bird generally sampled more than one inflorescence, so no obvious aggression between birds was detected. Displacement of one bird by another at the inflorescences was not observed, but instances when more than one bird was present were infrequent.

The Ponsaiti was visited by the Chiffchaffs regularly, perhaps daily, as long as the inflorescences remained. When several inflorescences were cut off the plant, Chiffchaffs were observed hovering over the positions formerly occupied by the inflorescences.

Later in the season, flowers of Lapeyroussia cruciata were visited for nectar. These
were further away from the window and observations were necessarily less detailed. Birds alighted slowly on the penultimate below the lowest flower. Nectar was obtained by inserting the bill into the corolla, nectar was then pulled out with the style on to the Chiffchaff's head. In some occasions, Chiffchaffs perched at the bottom of the corolla, the flowers often falling off the plant in the process. No attempt was made to recover nectar from fallen flowers. Feeding from Lapeyrousia angustata involved considerable predation risk. The flowers were all within one metre of the ground, in a garden which harbours several cats. Native fruits of L. angustata developed from flowers which had been visited by Chiffchaffs, but pollination need not have been due to the Chiffchaffs.

The birds alternated bouts of nectar feeding with hawking for Chironomidae. At no time was nectar feeding observed to be the sole mode of feeding.

Pursatellas, and other winter flowering plants whose flowers are rich in nectar are widely cultivated in Maltese gardens. There is no reason to believe that nectar feeding was confined to this group of plants to which the observations were made. Elsewhere, nectar feeding from Alium toadflax by Chiffchaffs can be inferred from the observations of Finlayson (Finlayson, J., 1991). Facial stains on Sardinian Warblers Sylvia melanocephala and Blackcap Sylvia atricapilla have also been noted in Malta (editorial note to Finlayson's paper). Besides providing sugars and amino acids, the nectar might be a welcome source of water in a relatively arid environment. The extent to which Sylviae warblers wintering in the Mediterranean region utilised nectar as a supplementary food source has yet to be determined.

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SOME NOTES ON SPOTTED FLYCATCHERS BREEDING AT BUSKETT DURING 1983-86


Following are some notes and records for the years 1983 to 1996:

1983: There were no breeding records, but an adult bird was seen on 28 June and again on 2 July.

1984: A record year. At least 5 pairs were present during June and July. Five nests were found and from four of these, fifteen birds are known to have fledged successfully. The other nest contained 5 eggs which never hatched. One of the nests was built on a large outer leaf of an Aleppo Pine Pinus halepensis. This is the first nest to be found on such a tree, all other nests had been found on Cyprus trees Cypripedium savigninianum and in a broad leaf evergreen hawking from the same type of tree.

1985: Three pairs were present. One raised two broods in the same nest, fledging 5 birds in all. Another pair had a nest with 3 young: on 16 June these were about 7 days old, but by 24 June the nest was not found and was presumed to have been stolen by man. It was also built in a local branch of a Pine tree; very low and visible, nests for the third pair were not found.

1986: A pair raised a brood of four. Young fledging successfully on 25th July. Another female laid two clutches of eggs, one of 4 and the other of 5. This female was presumably unmarked as the eggs never hatched. It is to be noted that 3 birds had built their first nest on an old nest from last year, and again the second clutch of eggs was laid in a freshly built one on top of the two other nests. The eggs from the first clutch were still beneath the last one.

It was noted that the same areas are used year after year, and the colour of eggs is exactly the same in such areas. This indicates that some of these Spotted Flycatchers are the same ones year after year.

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ANALYSIS OF YELLOW-LEGGED HERRING GULL PELLETS FROM FILFLA ISLAND

The Yellow-legged Herring Gull Larus michahellis colony on Filfla numbers about 150 pairs, and is mainly restricted to the inaccessible plateau surface. A very few pairs breed on the upper parts of the steepest slopes beneath the cliffs. It is from the latter nests and from nesting nearby boulders that this sample of pellets was collected.

The aim of this analysis was to find out whether the Storm Petrel Hydrobates pelagicus was under threat from the Herring Gull, from 11 samples (10 whole pellets, 2-3 fragments), remains of Storm Petrels were found in only four pellets. However, a much larger sample is needed to determine the extent of Herring Gull predation on Storm Petrels.

Herring Gulls have been noted to be very active at night, especially on moonlit nights, when petrels are most numerous (Sultana & Gauci 1982). This was so on the night of 28 May 1985, when a good number of petrels came ashore. The gulls were seen flying throughout the whole night. The chances of predation on petrels during daytime are very remote. Six adult Herring Gulls failed to catch an adult petrel flying off Filfla in broad daylight (Sultana & Gauci 1992). This might indicate that birds taken are probably weak or tired.

Materials examined: 18 whole pellets and 2 to 3 fragments where dissected. The average weight of each was 3.5g with a range of 1.5g to 8.0g. Weight was measured using a Pesola spring balance.

TABLE I : Contents of Yellow-legged Herring Gull pellets collected on 24 May 1986 on Filfla.

<table>
<thead>
<tr>
<th>Pellet</th>
<th>Storm Petrel</th>
<th>Other Birds</th>
<th>Molluscs</th>
<th>Fish</th>
<th>Insects</th>
<th>Others</th>
</tr>
</thead>
<tbody>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>11</td>
<td>(frag.)</td>
<td>1</td>
<td>-</td>
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<td>-</td>
</tr>
</tbody>
</table>

Contents of pellets:

Aves : Hydrobates pelagicus : 2 stomachs, 2 fused clavicles, 5 larvae, one with a ring attached, and a large amount of feathers. Pellets with remains of petrels had a strong oily smell. Passer hispaniolensis : 2 upper mandibles, 2 pairs of legs and an amount of feathers also in evidence. Pissolittacus aequinoctialis : 1 wing, 1 tail, 1 leg, Malacopterus fuscus : 1 bill, 1 wing. Haliotis tuberculata : 2 legs, 1 wing. Phyllopteryx sp. : 1 leg. Phoenicurus sp. : 1 tail, 1 leg.

With the exception of the Spanish Sparrow Passer hispaniolensis and the Stone Petrel, all the other species are trans-Saharan migrants which are probably caught as soon as they alight on Filfla, after their long journey, when they are weak and tired. The Spanish Sparrow is sedentary in theMaltese Islands, and a few pairs breed also on Filfla. The Stone Petrel is a summer visitor to the Malta Islands where it is found breeding only on Filfla.

Cephalopoda : Sepia officinalis : 2 beaks, 2 fragmented beakbones.

The Beliche is a rather common in Maltese waters, coming close to shores from early March to mid-May to breed.

Crustacea : Leptostraca : Shells were found in all of the pellets, one of which was deposited entirely of barnacles. The Ghost Barnacle is very commonly found and is found attached to rocks and debris by the shore.

Diatomophyta : (Siliquastrum) Trachurares gracilus : Half end of the fish was present in the pellets. The Horse-hacknion is one of the most common fishes found in Maltese waters. In size it varies from 29 to 52cm (Lanfranco 1965), this fish is also much favored by the Cory's Shearwater Calonectris diomedea, being frequently found amongst its requirements.

Insecta : Tenebrionidae (family): One complete specimen was found in pellet 5, along
FIRST BREEDING RECORDS OF THE MOORHEN IN THE MALTESE ISLANDS

The Moorhen Gallinula chloropus is a fairly common passage migrant from March to May and from late August to November in Malta. Juvenile and immature birds have been occasionally noted at Girgenti Valley and the techniques applied to the identification of bird remains, while the Flora and Fauna of the Mediterranean Sea by A. C. Campbell (1982) was consulted for the identification of marine remains.

The authors would like to thank Mr. Louis Cassar for the identification of insect remains.

References


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SYSTEMATIC LIST FOR 1983-84

compiled by CHARLES GAUCI

The regular contributors to the daily log kept by the Ringing and Research committee of the Ornithological Society during the two year period under review were: John Attard Montalto, John Borg, Alex Cachia, Charles Colella, Raymond Geata, Charles Gauci and Joe Sultana. Other contributors were: Guido Bonnici, Hans Aus, Denis Cachia, Richard Cachia Zennelli, Victor Cilia, Joe Doublel, D.M. Feil, Freddie Fenech, Natalina Fenech, Karlo V. Gauci, John Grech, Joe Grima, John Harflett, Anthony R. Heath, Roy Holland, Kevin Hallis, Joseph Manso, Paul Portelli, David Rusford, Martin Shade, Louis Vella and T. L. Walker. Other members may have contributed to the daily log kept at the Ghadira Nature Reserve, which records are subsequently added to the national daily and species logs.

The records for this two year period were entered into the daily log by Charles Gauci and then transferred to the species logs by Charles Colella. The systematic list has been compiled by Charles Gauci.

Where only one of the two years is given in the systematic list, it is because there were no records in the other year.

LITTLE GREBE Tachybaptus ruficollis Ringou Zohir
1983: 1 at Ghadira from 13 Nov onwards.
1984: 1 at Ghadira from 1 Jan to 19 Feb.

GREAT DRESDEN GREBE Podiceps cristatus Ringou Pile
1983: 1 flown over Dragonara Point on 20 Dec.

BLACK-HEADED GREBE Podiceps nigricollis Ringou Sawkod
1983: 1 at Ghadira from 1 Jan to 16 Feb, 2 at same place from 27 Nov onwards, 4 at Ghadira Bay on 28 Nov and 3 near Manoeli Island on 23 Dec.
1984: 1 from 1 Jan to 5 Feb and 1 on 10, 16 Feb at Ghadira; 1 at Salina on 15 Sep and 1 at Ghadira from 11 Dec onwards.

COPY'S SHEARWATER Calonectris diomedea Ciffa
1983: Highest count 2,000 over Sarrafu on 30 Apr. 1 in Comino Channel on 21 May and 1 on 24 Dec off Ghar Lapsi. Bred as usual.
1984: First seen on 21 Feb; found ashore in burrows during day on 14 Mar. Highest count 2,000 over Fate on 20 Apr. Some young still in burrows on 16 Oct.

MERLIN Falco merlinus Puffinus merlinus Cifiri
1985: 2 at Ghadira on 21 Dec; breeding at usual colonies. Some already ashore on 11 Dec.
1984: 500 counted off Pembroke on 16 Apr; otherwise very few day sightings.

STORM PETREL Hydrobates pelagicus Kanon 1st Flaga
1983: Recorded only on Filfla, where bred as usual.
1984: No sightings except on Filfla.

GANNET Sula bassana Sula
1983: 1 off Gnejna on 26th and 3 off Qasr Largi on 28 Dec.
1984: 1 on 1st, 4 on 2nd and 1 on 26th, all sighted offshore.

CORMORANT Phalacrocorax carbo Marignun
1983: 10 sightings of 1-3 birds on 6 days from 16 Oct to 10 Dec.
1984: 10 at Gammarulus on 13th and 2 at Righl on 27 Dec; 1 from Ramla Bay on 4 Nov.

BENNETT'S STURNUS sturnus Kanon
1983: 1 (seen at a taxidermist) was shot in Oct or Nov.

LITTLE BITTERN Anthropoides minutus Russell taz-lager
1983: 1 on 5 Apr; 10 sightings on 14 days from 27 Apr to 24 May; 2 birds off Ghadira on 5 May; mostly 1-2 birds but 5 at Ghadira on 7 May. Singles at Ghadira on 23 and 26 Jun.
1984: 5 records of singles on 4 days from 15 Apr to 6 May, 1 at Ghadira on 26 Oct.

HARDERI Phalacrocorax harderi Wclkas
1983: Sightings of 1-12 birds on 6 days from 2 Apr to 13 May. In autumn on 16 days from 16 Aug to 25 Oct; usually in small flocks, highest 30 on first date.
1984: 10 on 7 to 9 days from 30 Mar to 6 May, then on 19 days from 16 Aug to 29 Oct. Maximum flock size 20 over Ghadira on 11 Oct.
SQUAMOUS HERON Ardea ralloides t. armati 1984: 1 at Sliema on 4 April, then 1-2 at Madliena on 11 May.
1985: 1 at Marsaskala on 11 May, then 1 at Sliema on 15 May.
1986: 1 at Sliema on 13 May, then 1 at Madliena on 14 May.

WESTERN REEF HERON Ephippizaayloria 1983: 1 at Marsaskala on 22 May.
1984: 1 at Sliema on 17 May.

LITTLE WHITE HERON Ardea alba 1983: 1 at Sliema on 24 May.
1984: 1 at Marsaskala on 28 May.

GREAT WHITE HERON Ardea alba 1983: 1 at Sliema on 31 May.
1984: 1 at Marsaskala on 28 May.

PURPLE HERON Ardea purpurea 1983: 1 at Sliema on 29 May.
1984: 1 at Sliema on 28 May.

DARKER HERON Ardea melanocephala 1984: 1 at Marsaskala on 28 May.

BLACK STORK Ciconia nigra 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

WHITE STORK Ciconia ciconia 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

GIBBON G. leschenaultii 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

GREY STORK Ciconia nigra 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

BIRDS OF PREY

Raven Corvus corax 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Black Kite Milvus migrans 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

White-tailed Eagle Haliaeetus albicilla 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Short-toed Eagle Circaetus gallicus 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Goshawk Accipiter gentilis 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Hawk Aquila fasciata 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Bald Eagle Haliaeetus leucocephalus 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Red-tailed Hawk Buteo jamaicensis 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.

Osprey Pandion haliaetus 1983: 1 at Marsaskala on 16 May.
1984: 1 at Marsaskala on 16 May.
BLACK KITE Milvus migrans Astun Igwey 1983: A poor year, with singles at Dimmi Cliffs on 8 Apr and over Buskett on 7th and 10 Sep the only records.

1984: Another poor year; 1 at Dwejra on 7th and 2 over Gozo on 8 May, and 1 over Dimmi on 16 Sep.

RED KITE Milvus milvus Astun Ahmar 1984: 1 over Attard on 25 Sep.

FALCONS Falco sp. 1983: Short-tailed Eagle (Accipiter nisus) found at Xaghra on 16th and at Dinqli on 17th.

1984: Rufous Falcon (Falco tinnunculus) was shot at L-Akrax on 17 May and on Comino on 29 Sep.

LESSEK KESTREL Falco naumanni Spanjulet Sekond 1983: 6 at Naxxar on 17 May; 1 at Rabat on 27 Aug, and at Buskett on 3rd, 1 at 7th and 2 at Rabat on 30 Sep.

1984: Single at Santrnir on 20 Apr, at 7th on 14th and at L-Akrax on 17 May, and at Comino on 29 Sep.

WESTERN BOWS Falco columbarius 1983: Singles on 25th, and 2 at Rabat on 30 Sep.

1984: A few wintering, 9 singles recorded in Jan-Feb, spring passage from 6 Mar to 20 Apr during which period there were 27 records on 21 days; single figures, but up to 30 were counted in Nov on 11 Apr and on 8 May, 3 on 9th and 1 on 30 Jun, in autumn 1-2 on 6 days from 7 Aug to 15 Sep, and on 30 Sep.

RED-FOOTED FALCON Falco vespertinus Umbrell 1983: 13 records on 10 days from 1st to 21 May; mainly 1-2, but 7 on 5th, 10 on 11th, and 2 on 15th.

1984: 1 on 24th and 4 on 25 Apr, and 1 on 17 May.

MERLIN Falco columbarius Sager 14' Cerbu 1984: 1 at Zabbar on 8 Oct.

HOBBY Falco subbuteo Sever 14' Halimbewa 1983: 1-3 on 6 days from 15th to 30 Apr. In autumn, 1 on 31 Aug then from 6 Sep to 21 Oct when single figures, max 9, were recorded on 20 days.

1984: 1-4 on 6 days from 7 Apr to 26 May. On 20 days in autumn from 6 Sep to 26 Oct; generally low single figures, highest 6 at Dwejra on 3 Oct.

FLAMINeo FALCON Falco eleonorae Bla 14' Usalianw 1983: 1 at 1st Cenc on 1 May and 1 at Naxxar on 30 Apr, on 4 days in Sep at Buskett: 1 on 7th, 3 on 10th and 14th, and 1 on 23rd.

1984: Singles at Dingli Cliffs on 5th and at Ghur Lapsi 13th, and at Wejreta on 3rd, at Naxxar on 11th, and at Buskett on 14 Oct.

SAKER Falco cherrug Rias Rais Rapja 1984: 1 over Dingli on 13 Oct.


1984: 1 probable near Ghor Lesli on 12th and 1 at Dwejra, Gozo on 21 Jan; 2 flying north over Victoria on 25 Apr, singles at Dabreb on 3rd and at Dinili on 20 Oct, and possibly 1 over the Munbur-14' Cenc area on 15 Aug.

UNIDENTIFIED FALCONS Falco sp. 1983: 14 records of 1-6 birds on 11 days from 21 Mar to 15 May, and on 13 days from 8 Sep to 2 Oct when 1-6 birds mainly recorded, but max 30 on 27th and 'a passage' on 29 Sep at Buskett. Some September Kestrel sightings refer to Kestrel/Griffon sightings.

1984: 1 on 15 Jan, then 1-2 on 11 days from 21 Mar to 4 Jun, 1 on 13 Jul, then 1-4 on 8 days from 25 Aug to 21 Oct.

QUAIL Cataracts communis Stambeka 1983: Singles on 6 days from 2nd to 15 Apr, on 15 Jun and on 6 Oct.

1984: 6 on 15th and 2 on 16 Jun at Xamra, 1 on 11 Mar, and 1-5 on 5 days from 15th to 26 Apr. Singles on 26 Sep and 11 Oct, then up to 5 at Xamra throughout Dec.

WATER RAIL Rallus aquaticus Zabin te-Likwa 1983: 1 at Gharb throughout Jan and Feb and up to 4 at the same place from 25 Apr to early May. The only record outside Gharb was of 1 at Ramla Bay on 15-19 Nov.

1984: Recorded only at Gharb: 1-2 in Jan and Feb and 1-4 from 28 Oct onwards.

SPOTTED CRAKE Porzana porzana Gallozz Gallozz-t-Tikki 1983: Singles at Gnejna on 16th and at Ramla Valley on 25 Apr, and at Gharb on 7 May, 10 Oct and 5 Nov.

1984: 1 at Gharb on 26 Apr, and at Ramla Valley on 11th and at Gharb on 21 Apr, then 1 at Gharb on 19 days from 11 Sep to 15 Dec.

LITTLE CRAKE Porzana parva Gallozz Zehri 1983: Singles at Gharb on 8th and at Degla on 12 Nov.
1984: I found dead at Marsa Mabula Valley on 23 Jul.

M. S. CRANE: Galloxo Minor 

1984: 1 singles at L-Now on 28 Sep and at Dwejra on 29 Oct.

M. S. CRANE: Galloxo Minor 

1984: On most days at Ghadira from 1 Jan to 28 May with max of 10 on 7 May. Only 5 were recorded outside Ghadira during same period. I saw at Ghadira on 5 days from 5 Jun to 21 Jul, then slotted almost daily from 25 Sep to year-end and with max of 10 on 17 Dec. Again very few records outside Ghadira.

1984: 5 singles on most days at Ghadira from 1 Jan to 14 May with max of 8 on 5 Jan; 2 on 6 Apr-May at other localities; on 29-30 Jun and 1-2 on 8 days from 12 Sep to 15 Oct, then daily from 23 Oct onwards with max of 18 counted on 2 days. A pair breed in a quarry in the southern part of Malta.

COOT: Fulica atra 

1-5 at Ghadira, up to 15 in Jan-Feb, decreasing gradually between 1-5 Mar, then only injured birds remaining but 2 were seen on 26 and 29 Jan, and 1-3 from 1 Oct increasing to 4 on 19 Nov and progressively to 34 by 17 Dec. At Sliema on 23rd and 26 Apr, and at Ghadira on 19th, 14th on Rais al-Muharrem, and 5 on Luqa on 19th and 25th over Ghadira.

RAVEN: Corvus corax

1-4 on Dwejra on 19th, 1 over Qormi on 23rd and 2 over Ghadira on 30 Oct; 1 at Dwejra on 8th and 9th on Malta on 18 Nov.

1-2 at Luqa on 1st and from 24th on 13 Jun singles at Tas-Safar on 10 Apr and at Salina on 16 Sep; over Sliema on 7th and at Rais al-Muharrem on 14th. Over Dwejra on 14th; on 1 Oct at Rais al-Muharrem; and at Luqa on 19th and 25th over Ghadira.

HERON: Ardea cinerea

1-2 were shot during the last week of Dec.

LITTLE BIRDS: Turtus terracca Pillafr

1-2 at Hal Far on 15 Dec.

SPRING TIDE: Nannophonostro oostolagella palli-tal-Bahar

1-3 at Ghadira from 17-20 Apr and 3-5 Aug.

BLACK-WINGED STILT: Himantopus himantopus fras-servjent

1-3 at Sliema on 4th-13th and 18 Apr, on 3rd and 6th May and on 20 Jul, 9 on 6 Sep, and 1 on 22 Oct, all at Ghadira.

1-4 at Mellieha on 13th and 1 at Ghadira on 21 Apr; another at Ghadira on 20 May and flock of 11 over Ghadira on 17 Aug.

AVOCET: Recurvirostra avosetta Xifa

1-2 on 24th and 1 on 26th Nov; and on 23 Dec at Ghadira. Another was seen shot in late Dec.

1-2 on 25-26th, then 1 from 27 May to 8 Jun, at Ghadira.

SANDERLING: Calidris alba Pilsollva Baldo

1 on 14 days at Ghadira from 28 Apr to 28 May; singles, but 2 on 18th and 3 on 19th. Also singles at Salina on 29 Apr and on 18 Sep.

1-4 at Ghadira on 11 Apr, 31 May and 20 Sep, at Ghadira.

LITTLE STINT: Calidris minutus Tertuxa

1-2 on 18-19 Mar. Then daily from 24 Mar to 3 Jun when also often recorded in several other localities. Double figures on a few days in Apr and throughout most of May, with max of 30 on 3 days. In autumn again almost daily from 1 Jul to 8 Aug, but usually in single figures, max 16 on 30 Aug.

1-4 at Ghadira on 17 Jan. 1-2 on 4 days from 16th to 25 Mar, then almost daily from 1 Apr to 7 May. Max 14 on 10 May, 13 single figures on 18 Jul from 18th to 21 Jul with max of 10 at Ghadira and at Salina on 2 days.

BREEDING'S STINT: Calidris temminckii Tertuxa Griza

1-2 at Ghadira on 15 days from 19 Apr to 17 May and 3 at Ghaggha Rihana on 6 May. In autumn, singles on 19-21st and 28 Jul, 20-21 Aug and 1 Sep at Ghadira.

1-2 at Ghadira on 6 days from 25 Apr to 2 May, then 1 at Tala’ Qali on 29 May. In autumn singles at Ghadira on 16th, 22nd and 28-29 Aug, and on 16-15 Sep.

CURLEW SANDPIPER: Calidris ferruginea Baggazzi Hincar

1-3 on 31 Mar-1 Apr, then daily in varying numbers from 20 Apr to 28 May, mostly at Ghadira; peak on 14-22 May when 15-20 daily, one 14-16 Jun and 1 on 3-4 Jul; 1 at Said Dwejra on 1 Jun, 1 on 17 Sep and then on 17 Oct.

1-3 daily from 9-18 Apr, then 1-7 on most days from 28 Apr to 19 May, mostly at Ghadira. 1 on 2 Jun; 1-2 on 22-26 Jul, 7th-13th and 21 Aug. Then 1 daily from 25 Aug to 12 Sep and on 25-22 Sep.

GINTH: Calidris alpina Baggazzi tot-taz

1-3 on 9 days from 15 Apr to 4 May, 1 on 17th followed by 1-6 almost daily from 15 May to 26 Jun, then 1-2 daily from 27 Jul to 18 Sep, 1 on 26 Sep to 1 Oct, 1 on 26 Sep to 1 Oct and on 14th, 27th and 30 Dec.

1-3 on 30 Apr and 3 May; then present on most days from 21 Jul to 31 Oct; max 7 on 6 Oct but usually 1-2. Mostly at Ghadira.

RUFF: Philomachus pugnax Girwif

10 sightings on 7 days in Mar from 5th, with 20 at Luqa on 22nd highest, then 1-7 almost daily, mainly at Ghadira, from 3 Apr to 31 May. Then 9-12 Jun and at Ghadira on 18 Jul and 17 Nov.

1-3 on 24 Jan and singles on 15th and then single figures, max 5, on most days from 2 Mar to 20 May, followed by singles on 6 days from 2nd to 21 Jun. In autumn on 10 days from 15 Aug to 10 Oct with 5 at Salina on 21 Aug and 5 at la ...
WOOD SANDPIPER Tringa glareola Fucox tel.-Puhor
1983: Almost daily at various sites from 4 Apr to 21 May with 12 at 1st Gail on 5 May highest, 8 at Ghadira on 26 Jun. Again on several days from 9 Jul to 26 Aug; usually low single figures but 24 at Ghadira on 22 Jul. Singles on 18 Sep, 1st-2nd and 14 Oct.
1984: 1 on 19th, then on most days from 28 Mar to 4 May; max of 15 at Ghadira on 15 Apr, otherwise single figures. 15 at Ghadira on 28 Jun, then on several days from 9 Jul to 1 Oct with most from mid-Jul to and 4 Jul to 1 Sep; usually single figures but 100 on 5 Jul, 14 on 18 Jul and 25 on 24 Aug, at Ghadira.

COMMON SANDPIPER Actitis hypoleucos Regattina tar-fikka
1983: 1 at Ghadira on 4 days from 4-13 Mar, then almost daily of various sites from 31 Mar to 27 May; always in single figures except for 21 at 1st Gail on 29 Apr.
1984: On 17 Mar, then on several days from 9 Jul to 1 Oct with most from mid-Jul to and 10 on all days, except 4 in early Jun; always single figures with a total of 9 at sites on 15 Apr, with single figures on most days from 30 Jun to 2 Sep, then occasional singles to 11 Oct; single figures except for 19 at 1st Gail on 15 Apr.

TURNSTONE Arenaria interpres Monakall imarjil
1983: 1 at Ghadira on 6 May.
1984: 1 at Ghadira on 19-23 May.

BRUSH SANDPIPER Actitis hypoleucos Minu-mun
1984: I shot four Comino on 1 Mar.

MEDITERRANEAN GULL Larus melanocephalus Gawilha Rashe Siwhd
1983: On 4 days between 16 Jan and 15 March with 20 in Grand Harbour on first day highest, 1 at Ghadira 31 Jul, and 36 on 28 Nov followed by 3 at St. Julian’s and 2 at Ghadira on 28 Dec.
1984: Singles on 4 days from 15 Jun to 5 Feb, then on 3 days from 30 Oct to 26 Dec, with 6 at Ghadira on 22 Nov highest.

LITTLE GULL Larus minutus Gawilha Zhirh
1983: On 16 Jan, Small influx in Dec with 1 on 18th, 4 (3 sightings of 1,1,1,1) on 25th, 1-2 on 26th and 1-2 on 27th.

BLACK-HYREDED GULL Larus ridibundus Gawilha Rashe Sannenna
1983: Max, mainly in Siliena Creek and Grand Harbour with 17 in early Jun and 25 Mar, then 1-31 Mar and 24 Apr. Daily at low treble figures on most days with max of 280 on 2 Feb., 4 on 12th and 3 on 13 Nov. Then daily from 19 Nov to year end with max of 170 on 26 Dec.
1984: Daily from 1 Jan to mid-Mar, then less regular to 5 Apr; max was 855 on 9 Feb. I was frequently seen at Siliena Creek to 24 May. Singles on 11th and 22 Jul, on 18 Oct and 4 on 2 Nov, then daily from 17 Nov onwards with max of 206 on 3 days in Dec.

SLINDER-BILLED GULL Larus canus Gawilha Biddhuma Raga
1983: Singles at Ghadira on 5 Jul and at St. Julian’s on 29 Sep.
1984: I at Ghadira on 19 Aug.

ALQUUM’S GULL Larus audouinii Gawilha Gdduma Ahmar
1984: I at Ghadira on 19 Feb.

LESSER BLACK-BACKED GULL Larus fuscus Gawilha Dahrha Iswaed
1983: I on 22 Jan then 1-3 on 6 days from 27 Mar to 20 May. Singles on 7th and 25 Dec.

HEERING GULL Larus argentatus Gawilha Prime
1983: Breeding population appears stable. Single figures in harbours and coastal waters on most days but very few sightings between early Jul and mid-Nov.
1984: Much less than 2000 figures with max count away from breeding colonies Wilco 50 on Pepperbone on 4 May. Aus few fewer sightings in Jul-Oct.

KILLIWAKE Rissa tridactyla Gawilha ‘al-tal-inghela
1983: I in the north coming Channel on 4th and 1 found dead at Ghadira on 8 May.

GULL-BILLED TERN Sterna nivalis Cilweoppa Ghaduru
1983: On 11-12 Jun and 1 on 24 Jul at Ghadira.
1984: I at Ghadira on 29 Jul.

CASPIAN TERN Sterna caspia Cilweoppa Prime
1983: I at Ghadira on 8-10 Nov.
IL-MERILL No. 24 1986-87

BLACK ÖNION COLUMBA livia 1984: Singles at Ghadira on 21-24 Apr and on 23 May.

ALPINE SWIFT Apus apus 1983: 5 sightings of 1-2 birds from 17 Apr to 2 Jun, then 1 on 8 Sep.

SWALLOWS Riparia riparia 1983: 1-3 on 10 days from 9 Apr to 7 Jul, then 10 sightings on 9 days from 26 Aug to 12 Sep; usually 1-3 but 15 at Dwejra on 2 Oct.

ALPINE SWIFT Apus apus 1984: 1-3 on days from 9 Jan to 19 Feb, mostly at Sliema, then 2 on 7 Apr, 1 on 29 Jul and 1 on 5 Dec.

WHITE-WINGED BLACK ÖNION Chlidonias leucopterus 1983: 1 on 27 Apr and 4 on 7 May at Ghadira; 1 was found dead at Ta' Galli on 20 May.


WOODCOCK Lullula arborea 1984: 1 at Xemxija on 23 Oct.

SHRILL DUCK Stegopelia caruss Rhumala 1985: 1 on 3rd then almost daily from 9 Apr to the end of May; double figures on several days between mid-Apr and mid-May and treble figures on a few days with peak of ca. 1200 on 26 Apr. 1-3 at various sites throughout Jun then fewer in Jul-Aug. Autumn passage from 28 Aug to 1 Oct; most in the first half of Sep; mostly single figures with max of 19 at Buskett on 4th.

1984: Odd singles from 24 Mar, then almost daily from 10 Apr to 5 Jun with double figures on several days. A few of various sites in Jan-Jun; max with 6 at Buskett on 22 Jul, then on most days from 26 Aug to 14 Nov; always in single figures. Late bird on 24 Nov.

LOW-FLYING SWALLOW Hirundo rustica 1983: 1 from 8 Jan to 19 Feb, mostly at Sliema, then 29

CATTLE EGRET Bubulcus ibis 1984: 1 at Silena on 22 Feb.


CICHLIDAE Cichlidae 1983: 1 on 12 days from 12 Apr to 6 May, then singles on 12 Jul, in early Aug, and on 21 Oct.

BAKONÖT Toza alba Borbonum 1983: 12 sightings of singles on 10 days from 4th to 29 Apr. In autumn singles on 8th and 11th Jul and 18 Aug.

BARN OWL Tyto alba Borbonum 1984: 1 sighting of singles at four sites in Sep-Nov in Gozo.

SCOPS OWL Otus scops Kirkia 1984: 1 on 21 days from 28 Apr to 11 Sep.


INCHETTO Caprimulgus europaeus 1983: 5 sightings of 9 singles on 7 days from 18 Apr to 17 May. In autumn singles on 4 days from 7 Sep to 9 Oct.

SHRIKET Apus apus 1984: 1-4 on days from 16 Apr to 1 May and 1-2 on 4 days from 14th to 20 Oct.

SHRIKET Apus apus 1983: On most days from 1 Apr to 18 Aug, then less regular to 27 Sep, highest numbers between mid-May and mid-June and early to mid-Aug when often in treble figures with max of 500 on 2 Jun. Usually late bird on 25 Sep.

SHRIKET Apus apus 1984: On most days from 19 Mar to 10 Oct with short gaps between sightings from mid-Jun onwards. Treble figures, max 600, frequently between Apr and Aug. Late birds on 25 Sep.

PIALLIO SNIFAPalispa pallida Rundum Kemell 1984: 1 Singles on 15 Apr and on 22nd and 23 May, then 3 on 30 Jun.
1983: 1 on 21st, 5 on 27th, 4 on 29th and 1 on 29 Apr. all in Gozo.

Hausfuhrt. Richelius virid; Messiah
1983: 1-4 on 11 days from 16 Feb to 31 Mar, only a few in autumn when up to 13 days from 9 Sep to 17 Oct. 3 on 19 Nov.

Springs passage from 2 Mar to 11 Jun, then singles on 25th and 30 Jun. Peak numbers mid-Apr to mid-May when figures (due to 400) almost daily. In autumn singles on 4 days from 25 Aug to 16 Sep and then on 3 days, mostly, from 22 Sep to 27 Oct. 1-3 on 5 days from 16-26 Nov.

RICHARD 1983: 1-4 on 11 days from 1 Mar to 23 Apr. 8-16, with max of 250 at Ghadira. Reappears at the end of Nov. 1-3 in many areas in Jan-Mar to 15th, then 1 at San Gwann on 26-27 Mar, again from 1 to 7 Apr onwards up to 10 at Lunzjata on several days in Oct to mid-Nov.

1983: At Lunzjata on 20th, and at Buskett and at Ghar Dalam on 23-25 Apr. Again from 1 at Lunzjata on 20th, and at Dwejra (Gozo) 15-21st, at Lunzjata on 20th, and at Ghar Dalam on 23-25 Apr.

RICHARD 1983: 1-4 on 11 days from 16 Feb to 33 Mar, then on 1st April to 4 Jun with a peak in Late Apr to mid-May, max 1000 at Ghajn Rihana on 11 May. 1-11th and 2 on 18 Aug and 22 Sep, then singles on 20th and 30th.

1983: 1-4 on 9 days from 3 Apr to 1 May. in autumn 15 sightings of 1-2 birds on 13 days from 28 Aug to 8 Oct.

1983: Up to 5 in several places in Jan-Mar to 25th, then 1-5 on most days up to 14 Apr. Again from 1 Oct onwards with medium double figures on most days from the end of Oct.

1983: Up to 5 in several places in Jan-Mar to 25th, then 1-5 on most days up to 14 Apr. Again from 1 Oct onwards, reaching double figures by 18th. Max 100 at Hal Far on 9 Nov.

1983: Up to 5 in several places in Jan-Mar to 25th, then 1-5 on most days up to 14 Apr. Again from 1 Oct onwards with medium double figures on most days from the end of Oct.

1983: Up to 5 in several places in Jan-Mar to 25th, then 1-5 on most days up to 14 Apr. Again from 1 Oct onwards, reaching double figures by 18th. Max 100 at Hal Far on 9 Nov.

1983: 1 on 2 Jan. on 15th, then on most days from 27 Mar to 14 May with double figures, then max 45. In Oct, the latter half of Apr., in autumn 15-20, then from 22 Sep to 20 Aug; mostly high single figures and occasionally up to 20.

1983: 1 on 3rd, then daily from 17 Mar to May, always in single to low double figures. In autumn on most days from 29 Aug to 29 Oct but never more than any one place.

MEADOW PIPIT 1983: 1 on 2 Jan. on 15th, then on most days from 27 Mar to 14 May with double figures, then max 45. In Oct, the latter half of Apr., in autumn 15-20, then from 22 Sep to 20 Aug; mostly high single figures and occasionally up to 20.

1983: 1 on 3rd, then daily from 17 Mar to May, always in single to low double figures. In autumn on most days from 29 Aug to 29 Oct but never more than any one place.

1983: 1 on 2 Jan. on 15th, then on most days from 27 Mar to 14 May with double figures, then max 45. In Oct, the latter half of Apr., in autumn 15-20, then from 22 Sep to 20 Aug; mostly high single figures and occasionally up to 20.

1983: 1 on 3rd, then daily from 17 Mar to May, always in single to low double figures. In autumn on most days from 29 Aug to 29 Oct but never more than any one place.
CElli'S WARBLER  

**KEDWING**

**SA.V!**

**RING OUZEL**

**F 1 ELDfiRE**

**BLUE ROCK**

1983 : Numbers still low, though slight increase apparent over previous year. Max count of 10 at Lunzjata and 9 Sep, with many days without sightings. In autumn single figures on most days from 2 Aug to 9 Aug with max of 10 at Lunzjata on 9 Sep.

**Sedge Warbler*** Acrocephalus schoenobaenus** Rammal tas-Sirmar

1985 : 1 on 5th and 4th, with max of 10 at Wied il-Mielah and low double figures, max 15 at Lunzjata and 10 at Ramla Valley on 28 Apr. 2 on 27th and 10 on 28 May. In autumn singles on 3rd and 9 Aug, and on 13th and 27 Sep, then low influx on 10 Oct when a total of 12 recorded on a single day at Xemxija. Max count of 25 on 21 Oct.

1984 : Spring passage from 18 Mar to 26 May, but there were many days with no sightings. Max totals of 7 on 1st and 9 on 24 May, otherwise 1-3. In autumn singles on 19 Sep and 4 Sep, then 1 daily at Lumjata from 12-25 Oct.

**MWSH WARBLER*** Acrocephalus palustris*** Bahahl la·l-Khadjar


**RED WARBLER*** Acrocephalus arundinaceus** Bekkalat ta·l-Ghsab

1983 : From 9 Apr to 29 May in spring with a peak on 28 Apr to 5 May when recorded daily, with max of 7 at Ramla Valley on 26 Apr. 1984 : Singles on 5 days from 15 Jul to 10 Aug, then on most days from 18 Aug to 14 Oct, when single figures in many places, with max of 10 at Lunzjata on 24 Sep. 1985 : 1 at Ghadira on 24 Jun. Singles on 2nd, 18th and 31 May were the only spring sightings. In autumn single figures on most days from 2 Aug to 7 Sep with max of 10 at Lunzjata on 9 Sep.

**GREAT RED WARRLER*** Acrocephalus schoenobaenus** Bekkalat ta·l-Ighmara

1983 : Present in small numbers in many places throughout the year. Max counts on 10 at Ghadira on 3 Apr and at Pembroke on 15 May. 1985 : Numbers still low, though slight increase apparent over previous year, Max count on 20 at Pembroke on 24 Apr. 1984 : 1 on 2 Oct, then on most days from 1-13 May, then singles on 23 May and 2 Jun. In autumn 1 on 2 days from 19 Aug to 18 Oct.

**MELODIOUS WARRLER*** Hippolais pallida** Bekkalat ta·l-Mahsa

1983 : First in spring on 23 Mar. 1st sighting of 1-3 birds from 28 Apr to 1 Jun and 1-2 on 9 days from 23 Aug to 19 Oct.

**SPECIATED WARRLER*** Sylvia communis** Bufula Hamra

1985 : Present in small numbers in many places throughout the year. Max counts on 10 at Ghadira on 3 Apr and at Pembroke on 15 May. 1984 : Numbers still low, though slight increase apparent over previous year, Max count on 20 at Pembroke on 24 Apr.

**SUBSPECTED WARRLER*** Sylvia communis** Bufula Passajra

1983 : Up to 9 in many places from 15 Mar to 10 Apr, then singles on 4 days from 17 Apr to 13 May. In autumn almost daily from 29 Jul to 10 Oct, with low double figures in many places in Aug-Sep. Max 20 in various places on 15 Oct. 1984 : Single figures on several days from 17 Mar to 26 Apr, then on 2 May. 1 on 30 Jun. Autumn passage from 18 Jul to 12 Oct with a peak from late Jul to mid-Sep, max 30 at Wied il-Mielah on 12 Aug.

**SANDIONI WARRLER*** Sylvia melanocephala** Bufula Sewda


**LEESER WHITEHROAL*** Sylvia communis** Bekkalat ta·l-Mahsa

1983 : 1 on 10th and 14th, then single figures daily from 17 Apr to 3 May, with a few singles till 26 May. Max 6 at Lunzjata on 28 Apr. In autumn singles on 19 Aug, 1st and 5 Sep, and 6 Oct.
1984: Up to 10 on most days from 10 Apr to 3 May, then singles on 11th and 26 May. Singles on 29 Apr, 11 May, 12 Sep, and 13-14 Oct.

GARDEN WARBLER Sylvia borin Bekafik
1983: On most days from 18 Apr to 21 May; single figures, with max of 10 at Ghadira on 25 Apr. 1 at Buskett on 11 Jun, in autumn on 10th, then almost daily from 12-19 Oct. Max of 50 double figures in days. In Late Aug and throughout Sep, with max of 10 at Wied il-Luq on 11 Sep.
1984: Single figures on most days from 10 Apr to 16 May with 10 at Sarraflu on 25 Apr highest. 1 at Ghajn Rihana on 15 Jun. Autumn passage from 16 Aug to 9 Nov, but in smaller numbers than usual, max being 10 at Chadwick Lakes on 10 Sep and at Xemxija on 21 Oct.

BLACKCAP Sylvia atricapilla Kapilfer
1983: Double figures in suitable areas in Jan-Apr to 10th, but treble figures at Buskett where max count 1,000 on 20 Mar. Singles on 13th and 28 Apr, then 1 on 6 Sep, and singles from 9 Oct onward. Single figures on 9 Oct from 9 Oct onward at Chadwick Lakes on 20-31 Aug and at Lużna on 5th and 18 Sep.
1984: Single figures from 11 Nov to 2 May; only single figures, max 6 on Comino on 15 Apr, 1 on 17 Sep.

PENDLEIN Luscinia pendulina Pendulin
1983: 2 at Lużna on 2nd, then two birds at Ramla Bay on 16-16 Nov.
1984: 3 at Shadira on 11 Mar.

GOLDEN ORIOLE Oriolus oriolus Ta'jar Satra
1983: Single figures on most days from 14 Apr to 20 May, but up to 15 on 27 Apr and 2 May, in autumn 5 sightings on 4 days from 26 Aug to 11 Sep; singles, except for 1 at Lużna on 5 Sep.
1984: Spring passage from 15 Apr to 24 May but not daily; max 10 at Dwejra (Malta) on 29 Apr. 1 at Buskett on 8 Jul, then 10 sightings of 1-3 on 9 days from 20 Aug to 15 Oct.

RED-BACKED SHRIKE Lanius collurio Kacemendula Hamra
1984: Singles at Shadira on 2nd and 12th, and at Sarraflu on 14 Oct.

WOODCHAT SHRIKE Lanius senator Kacemendula
1983: Singles or twice frequently from 1 Apr to 15 May. Singles near Chadwick Lakes on 4 Jun, at Lużna on 17th and at Xemxija on 15 Jul. 1-2 on 5 days from 27-31 Aug when the only autumn migrants recorded.
1984: 1-2 in many areas on several days from 15 Apr to 26 May (daily from 22 Apr to 9 May). 1-2 were at Xemxija from 26 Jun to 15 Jul and 3 (family party) at Tjal-Belal on 6-11 Jul. In autumn 1-2 on 6 days from 15 Aug to 17 Sep.

STARLING Sturnus vulgaris Sturnell
1983: Double to low treble figures in some areas in Jan-Early Mar, with 200 at Lużna on 8 Mar, 100 at Lużna on 22 Mar, 100 at Lużna on 27 Mar, and 100 at Lużna on 29 Mar. Single figures in Jan-Mar to 15th, then singles irregularly to 17 Apr. 1 on Comino on 23 Jun and 2 at Buskett on 15 Jul. 1 on 22 Sep, then from 3 Oct onwards. Highest counts 2000 at Marsa on 5 Nov and 2500 at Lużna on 19 Dec.

RED-VEED WOOD WOOD COLOURED WOOD WOOD COLOURED
1983: 1 trapped and ringed at Moliensa on 29 Oct (1st for Mellieha Islands).

SPANISH SPARROW Passer hispaniolensis Gammiel tail-Bej7
1983: A Marabout as usual.

FRIE SEAGULLs, Black-headed Gulls, Gammiiel tail-Sigar
1983: Breeding in usual areas, with max counts 30 at Chadwick Lakes and at Lużna.
1984: 1 on 10 Chadwick Lakes in Jul-Sep highest at breeding sites. Passage and wintering birds elsewhere in Jan-Mar and Oct-Dec, max 10 at Ghadira on 29 Feb and at Xemxija on 15 Oct.

FLYING FOXES Pteropus callicopterus Sposono
1983: Single figures in Jan-Apr but up to 2 at Buskett in Jan, 1-3 at Buskett in May-Sep during which period occasional sightings also at Chadwick Lakes and at Ghadira.
1984: Single figures of autumn at 9 Oct, then in low double figures till 11 Oct. Single figures in Jan-Mar, then scattered singles in Apr-May. In Jun-Sep up to 8 at Buskett and 1-3 sporadically in a few other places. From 9 Oct onwards in...
autumn, often in high double figures, max 90 at Dwejra, Malta on 8 Nov. Smaller numbers in Dec.

Serinus serinus Apparell
1983: 1 low single figures in a few areas in Jan-Mar to 20th, 1 on 16 Apr, 1-2 on 19-30 May, 1 low single figures on most days from 8 Dec onwards, max 10 at M Zejo on 26 Dec.
1984: 1-3 on a few days in Jan-Mar to 11th. Singles on 8 days from 20 Apr to 18 Aug, most at Dwejra and at Buskett. 1 on 11 Oct, then single figures sporadically from 1 Nov, becoming more regular after 9 Dec.

Carpodacus carabellus Verdun
1983: 1-3 on 3 days from 1 Jan to 23 Feb, then 1-5 on 12 days from 20 Mar to 29 Apr, frequently at Dwejra in May-Aug, 1 at Chedwick Lakes on 8-12 Jul, 1 near Lija on 17 Jul, and 5 at Lunzjata on 8 Aug. Singles on 4 days from 16 Sep to 17 Oct, with up to 200 at Lunzjata on 8 Nov.
1984: 2 on 3 Jan, then 1-2 on 12 days from 6 Mar to 5 Nov. Singles recorded from 6 areas between late May and mid-Sept but 5, probably a family party, were at Dwejra on 9 Jun. Frequently recorded from 12 Oct to year end, often in low double figures and with max of 200 at Lunzjata on 8 Nov.

Carpodacus erythrinus Saffell
1983: 1 Singles at Dwejra on 26 and 29 Nov.
1984: 1 on 29 Nov.

Linyves proctorii Verrill
1983: 1 in a section of RINGING REPORT FOR 1984-85
1984: 1-3 on 3 days from 1 Mar to 10 Apr, 1 at Chedwick Lakes on 23-24 Jul, then singles on 4 days from 5 Nov to 9 Dec.

Carduelis spinus Ekru
1983: Singles at Dwejra on 26 and 29 Nov.
1984: 1 on 30 Nov.

As usual, this report consists of a list of ringing and recovery totals to the end of 1985, a section dealing with recoveries of locally-ringed birds, as well as a section listing foreign-ringed birds recovered in the Maltese Islands.

As in past years, C. Gauci, the Ringing Secretary, has been responsible for the recording and filing of ringing and recovery data and report cards, as well as for the issue of a bi-monthly ringing newsletter for ringers.

Joe Sultana & Charles Gauci
Ringing Officer, Ringing Secretary
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<td>Carduelis spinus</td>
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<td>Linnet</td>
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<td>Emberiza pubilla</td>
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<td>Emberiza schoeniclus</td>
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<td>Sillaria galadrange</td>
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<tr>
<td>Swallow x House Martin</td>
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<tr>
<td>Hirundo rustica x hirundo rustica</td>
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<tr>
<td>Tree Sparrow x Spanish Sparrow</td>
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<td>Passer montanus x hispaniolensis</td>
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<td>totals</td>
<td>8,718</td>
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<td>153,359</td>
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<td>900</td>
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This section deals with 31 recoveries of 16 species reported during 1984-85. Only those found at least 5km away from the ringing site are included. The co-ordinates of the localities are given once when those are first mentioned.

**Key to symbols and terms used in the recovery list:**
- Recoveries are arranged by species, and within species usually by date of the recovery letter.
- Ringing details are given on the first line and recovery data on the second.
- Ring number: where this is followed by an asterisk (*) the ring has been returned.
- Age code: 1 - pullus; young bird ringed in the nest. 2 - fully grown year of hatching quite unknown. 3 - definitely hatched during current calendar year. 4 - hatched before current calendar year; exact year unknown. 5 - definitely hatched during last calendar year. (A number in brackets beside the age code indicates the size of the brood).
- Sex: M - male; F - female.
- Date of recovery: where this is unknown the date of the reporting calendar year is given instead and is shown in brackets. An asterisk (*) in the date indicates that the exact day or month are unknown.
- Manner of recovery: v = caught or trapped, and released with ring. * = shot or killed by man. x = found dead or dying. t = found or trapped alive and not released, or released but with ring removed. # = manner of recovery unknown.

- Yellow-legged Warbling Gull Larus cachinnans
  - OP27.677 1 30.05.85 Flitfa: 35.47 N, 14.25 E.

- Kingfisher Alcedo atthis
  - S44.741 1 05.10.65 Ghadira: 35.58 N, 14.21 E.

- Sand Martin Riparia riparia
  - 41.411 4 06.05.85 Ghadira: 35.58 N, 14.21 E.

- Swallow Hirundo rustica
  - 24.840 * 4F 17.04.82 35.54 N, 13.35 E (Pizzen), CZECHOSLOVAKIA.
  - 24.262 4F 10.05.02 Lunzjata Valley.

- House Martin Delichon urbica
  - 15.190 4 16.05.81 Lunzjata Valley.

- Dunnock Prunella modularis
  - 37.697 5 16.11.84 Ghajn Zejtuna: 35.58 N, 14.22 E.

- Robin Erithacus rubecula
  - 35.218 4 15.10.84 Munqar: 36.02 N, 14.14 E, Gozo.
  - 35.790 * 3 26.10.84 Sarrafu: 36.05 N, 14.13 E, Gozo.
  - 35.682 * 3 30.10.84 Sarrafu, Gozo.

- Cetti’s Warbler Cettia cetti
  - 36.930 3F 05.05.86 Chadbuck Lakes.

- Fan-tailed Warbler Cisticola juncidis
  - 24.064 3 05.07.84 nr. Chadbuck Lakes.

- Subalpine Warbler Sylvia cantillans
  - 27.013 3F 01.08.83 Birzebbuq, v=4F.

- Blackcap Sylvia atricapilla
  - 35.060 3M 11.11.83 Ghajn Zejtuna.

- Chiffchaff Phylloscopus collybita
  - 29.247 4F 15.01.85 Ghadira, v=4F.

- Willow Warbler Phylloscopus monticolus
  - 47.597 3 20.10.82 Lunzjata Valley.

- Firecrest Regulus ignicapillus
  - 0A.544 5M 24.11.84 Xemxija.

- Firecrest Regulus ignicapillus
  - 0A.625 3M 10.11.85 Xemxija.

**Notes:**
- Mostc:
  - Hei-Saptan: 35.50 N, 14.30 E.
  - Moste: 35.55 N, 14.26 E.

**Localities:**
- Mostc: 35.50 N, 14.30 E.
- Hei-Saptan: 35.50 N, 14.30 E.
- Moste: 35.55 N, 14.26 E.
FOREIGN RINGED BIRDS RECOVERED IN MALTA

This section deals with 20 foreign ringed birds of 19 species recovered in Malta. Some of these were recovered previously to the two-year period covered by this report but either recovery or ringing details only reached us during the two-year period under review. The symbols and terms used are the same as those in the previous section.

Honey Buzzard Pernis apivorus
Helsinki 1 10.08.81
Osorey 2 10.10.81

Marsh Harrier Circus aeruginosus
Riga 4M 17.08.78
C-13.155 * 07.10.84

Osprey Pandion haliaetus
Helsinki 1 10.07.84

Kestrel Falco tinnunculus
Praga 1 03.07.77
E 241.220 ( ) 00.11.84

Hobby Falco subbuteo
Praga 1 17.07.82
H 69.041 * 00.09.83

Kentish Plover Charadrius alexandrinus
Sofia 1 24.05.85

Curlew Sandpiper Calidris ferruginea
Stockholm 1 30.08.78
3,328,582 v ( ) 01.04.85

Reft Philomachus pugnax
Helsinki 3M 29.08.84
Helsinki 1 31.07.84

Great Skua Stercorarius skua
London 1 15.07.80
HN 81746 * 01.05.84

Caspian Tern Sterna caspia
Stockholm 1 10.06.80
7,078,012 x 22.10.80

Turtle Dove Streptopelia turtur
Praga 12/2 10.06.82
H 44.896 v 01.05.85

Sand Martin Riparia riparia
Praga 3 22.07.81
1 168,978 v 24.04.82

Swallow Hirundo rustica
Arnhem 1M 12.06.82
A 155,494 * 23.09.85

Tree Pipit Anthus trivialis
Budapest 3 28.08.83
593,793 v 31.03.85

White Wagtail Motacilla alba
Praga 15/5 08.05.81
1 189,861 v 00.11.81

Sedge Warbler Acrocephalus schoenobaenus
Helsinki 3 16.09.84
V 94,860 v 13.10.84

Goldfinch Carduelis carduelis
London 3F 01.05.85
C 280,419 + ( ) 03.12.85

Siskin Carduelis spinus
Sempach 2 24.10.84
A 419,954 ( ) 29.11.85

Demenița: 55.04 N, 19.43 E, Blakings, SWEDEN.
Salina: 35.55 N, 14.25 E.

Stenare: HÅLEN: 60.38 N, 17.54 E (Upplands), SWEDEN.
Delimara: 35.49 N, 14.34 E.

Kamenica nad Hronom: 47.20 N, 18.46 E (Nové Zámky), CZECHOSLOVAKIA.
Demenița: 35.55 N, 14.20 E.

Sand, North (reported as controlled (1)).

Snellands, Pond ( Reported as controlled (1)).
Colonies of Cory’s Shearwaters in Malta are found in such limestone cliffs. This makes it very difficult to carry out studies on their breeding biology. (Photo: Joe Sultana).

Nest of Moorhen, a new breeding species for Malta, see page 20. (Photo: Joe A. Doublet)

A NEW GUIDE TO THE BIRDS OF MALTA.
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You may order a copy directly from the MOS, P.O. Box 498, Valletta, Malta. All proceeds will be devoted by MOS towards bird conservation in Malta.

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<tr>
<td>Youth (under 18)</td>
<td>Lm 0.50</td>
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<tr>
<td>Life member</td>
<td>Lm 50.00</td>
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