Outward (autumn) bird migration at the Southeastern Peninsula and Cape Greco, Cyprus: the phenologies of regular migrants

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Birds on their outward migration were counted in Cyprus at the Southeastern (SE) Peninsula, which includes Cape Greco, from 3 September to 27 October 2005 inclusive. Birds passing during the day were counted continuously and 4 to 5 transect counts were conducted daily to estimate the densities of resting birds. Phenologies are presented for all species observed 50 or more times. The results considerably augment our knowledge of many species, shedding new light on their autumn migration phenology. Strong diurnal movements of herons, raptors, bee-eaters and swallows were observed. The total numbers of European Bee-eater *Merops apiaster* met the Important Bird Area C3 criterion. For the first time a significant passage of Eurasian Crag Martin *Ptyonoprogne rupestris* is noted. The area of the SE Peninsula is an important stopover for many *Sylvia* warblers, Eurasian Stonechat *Saxicola torquatus*, Isabelline Wheatear *Oenanthe isabellina* and Black-eared Wheatear *O. hispanica*.

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INTRODUCTION

Most eastern bird populations cross the Middle East on both outward and return migrations to and from Africa. Impressive passage of passerines is known from various sites, such as Eilat (Morgan & Shirihai, 1997) and Jordan (Khoury, 2003). Instead of following the mainland route through Turkey into Syria, some birds appear to choose the more direct way across the Mediterranean Sea by using Cyprus as an important stepping stone and resting place. The avifauna of Cyprus is well-known (Flint & Stewart, 1992). Each year the observations of resident or visiting birdwatchers are collected and compiled in annual Cyprus bird reports (*eg* Flint 2001, Gordon 2002, 2004; Richardson, 2005). Much is known about vagrants and unusual species, but regular species are under-represented in the observations submitted. Furthermore, observations do not cover the whole year evenly. From such data it is difficult to compile the phenology patterns of regular migrants. In our study we investigated outward bird migration on the Southeastern Peninsula, which includes Cape Greco (**Fig 1a**) – it was one of the first studies in which birds were counted systematically on a daily basis over a long period. We present the phenologies of 57 regular migrants.





Figure 1a. Location of the study area.

Figure 1b. Transects positions on the SE Peninsula.

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STUDY SITE AND METHODS

Cyprus, the largest island in the eastern Mediterranean, lies c80km south of the Turkish coast c170km west of Syria. Cape Greco is the tip of the southern coast's easternmost peninsula, the island's geography lending itself to describing this feature as the Southeastern Peninsula, which comprises extensive inland cliffs and rocky limestone areas hosting a rich mixed plant community – extensive high and low acacia scrub and juniper trees are part of a patchwork that includes stubble fields and vast rocky heaths dominated by low dry grasses. Stands of tall trees amid dense vegetation along dry drainage ditches punctuate a landscape of low bushes, fruit and vegetable plantations (tomato, potatoes, olive and carob trees) and many fields of arable crops (oats, wheat). In addition many abandoned fields, uncultivated for years, still contain oats gone to seed (detail obtained from Loosli & Schneider 2004). The peninsula's geographical location is shown at **Fig 1a**; some of its key habitats are at **Plates 1-8**. From 3 September to 27 October 2005 inclusive, diurnal bird migration was counted daily from a single fixed point with good views in all directions. For a description of the method, see Roth & Corso (2007). During the same period, a team of three to five skilled birdwatchers undertook line transects to count resting migrants. We used the transect method as proposed by Pomeroy & Walsh (2006), counting every morning between 06.00 and 09.30 along the same four straight lines of 800m to 900m long (Fig 1b shows the transect positions). Because the SE Peninsula is a small-scale mosaic of habitat types (see above and **Plates 1-8**), every transect crossed several habitat types. The transect lines had been determined by choosing coordinates randomly for the starting points and transect directions. This random selection of transect lines ensured that all habitat types were covered in the proportion of their occurrence on the SE Peninsula. We originally had selected five transects, but due to intense bird shooting, we had to reduce the length of the fifth transect to 500m, where our counts were restricted to the period from 6 to 27 October (dashed line in Fig 1b). In the evenings between 16.00 and 18.00 we repeated two of the four main transects (alternate pairs each evening). We carried out all counts on foot at a constant and slow pace, the minimum duration being 45 minutes per transect and the maximum 75. Additionally, all other observations of birds, those not recorded during transect or diurnal migration counts -ie en route to or from the transect – were recorded in estimated numbers and related to the time of the day. At the end of the day the casual observations of all observers were summarized. To avoid double counting, the times of observations were compared and observations of the same birds were excluded. Casual observations are subject to bias due to changing weather conditions or the duration of such observation periods, and so were totalled and correlated in a separate database from that built from the systematic diurnal and line transect observations. Two ephemeral freshwater pools (Plate 8) not covered by transect work were checked sporadically - these observations were included in the casual bird observation database. Observations from all three databases - diurnal migration, transect counts and casual observations - were summarized for each day. For Figs 2-6, the mean numbers counted in each five-day interval, or pentad (Berthold 1973) are used. We present graphs of the phenologies of all migrant species with more than 50 records.

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Plate 1. Southeasterly view, from Phanos summit (175m). © Samuel Ehrenbold.



Plate 2. Phanos watershed, looking towards the south coast. © Samuel Ehrenbold



Plate 3. Western sector of the SE Peninsula. © Samuel Ehrenbold



Plate 4. Northwestern sector of the SE Peninsula. © Samuel Ehrenbold



Plate 5. Kambos, in the northeast sector of the SE Peninsula. © Samuel Ehrenbold



Plate 6. Traditional Cypriot farm, Kambos. *© Samuel Ehrenbold*



Plate 7. Agiois Ioannis valley, interior of the SE Peninsula. © Samuel Ehrenbold



Plate 8. Ephemeral freshwater pool, near Aya Napa. © Samuel Ehrenbold

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RESULTS AND DISCUSSION

A total of 190 species was recorded during the whole study period. In the figures we present the phenologies of migrants with a total of at least 50 observations (**Figs 2-6**).

Phasianidae

The results of this study suggest that the Common Quail *Coturnix coturnix* was a common migrant in the study area, with peak migration from the end of September to early October (**Fig 2a**). Apart from the transect observations, birds could be seen at various locations, even near houses and along streets. Three individuals were found dead on the road. The general status of Quail in Cyprus remains obscure. In some autumns there is no obvious passage (Flint & Stewart 1992), but in others it is a common migrant from late August to October (Flint 2001). In recent years only very few individuals were recorded in autumn (Gordon 2002, 2004; Richardson 2005).

Ardeidae

There was conspicuous migration of herons and egrets along the southeastern coastline of Cyprus. The total number of Black-crowned Night Heron *Nycticorax nycticorax* includes only the birds seen during the day (mainly during early morning hours, **Fig 2b**). During several nights Night Herons were heard calling, indicating migration during the night; these observations have not been included in the figures. Small flocks of Night Herons rested during the day in trees within the area of the SE Peninsula. Flint and Stewart (1992) pointed to the heavy westward passage of herons along the northern shore of Cyprus. Southwesterly migration directions prevailed on the eastern shore; the numbers may have been smaller compared to the numbers migrating along the north coast (Flint & Stewart 1992) but are still of relevance. In decreasing numbers, the other species were Grey Heron *Ardea cinerea* (**Fig 2d**), Purple Heron *A. purpurea* (**Fig 2e**) and Little Egret *Egretta garzetta* (**Fig 2c**)

Falconidae and Accipitridae

The maximum daily count of European Honey Buzzard *Pernis apivorus* was on 4 September, 2250 individuals (**Fig 2f**). This is one of the highest numbers ever recorded in Cyprus (Flint & Stewart 1992, Gordon 2002, 2004; Richardson 2005). Other raptors with notable numbers on migration were Western Marsh Harrier *Circus aeruginosus* (**Fig 2g**), Montagu's Harrier *C. pygargus* (**Fig 2h**), Eurasian Sparrowhawk *Accipiter nisus* (**Fig 2i**), Red-footed Falcon *Falco vespertinus* (**Fig 2j**) and Eurasian Hobby *F. subbuteo* (**Fig 2k**). More detailed results of these species groups have been discussed elsewhere (Roth & Corso 2007).

Gruidae

Most individual Common Crane *Grus grus* passed Cape Greco in the space of a few days during early and late October (**Fig 2l**). The exceptionally early weather depression of 18 October with rain and strong southeast winds may have caused a break in crane migration. Migrating birds may also have drifted towards the west during these strong winds. The cranes were commoner at the SE Peninsula in former years (Edith Loosli and Eberhard Schneider *in litt*).

Burhinidae

During the study period the only wader regularly on stopover on the SE Peninsula was Eurasian Stone-curlew *Burhinus oedicnemus* (**Fig 3a**). The species also breeds on the peninsula and some of the individuals may have been local birds. However, the phenology indicates that there were maximum numbers during the end of September and early October suggesting passage migration. Most probably many more individuals pass Cyprus at night without roosting (Flint & Stewart 1992).



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Columbidae

The phenology of Woodpigeon *Columba palumbus* shows two main peaks (**Fig 3b**): one during the beginning of the study period, and the other at the end. It is possible that this pattern is not caused so much by migration (such as the passage of two different populations), as by hunting: the hunting season was open from 4 September to 2 October and the Woodpigeon is one of the target species. Eurasian Turtle Dove *Streptopelia turtur* was a regular migrant in rather low numbers during the study (**Fig 3c**). Numbers have declined in recent decades when formerly hundreds or even thousands were reported up to the 1970s (Gordon 2004, Richardson 2005).

Apodidae

Only a small fraction of the observations of Common Swift *Apus apus* or Pallid Swift *A. pallidus* could be identified as to species. Most of the migrants were likely Common Swifts, given that Turkey, for example, has only c1000bp of Pallid Swift against c1 000 000bp of Common Swift (BirdLife International 2005). Furthermore, most Pallid Swifts may have headed south much earlier, before the period of our study (Richardson *in litt*). The peak of Common Swift passage (the counts may include a few unidentified Pallid Swifts) was in mid-September and migration stopped at the end of September (**Fig 3d**). The peak of Alpine Swift *Tachymarptis melba* passage was earlier than that of Common Swift, but the passage lasted longer, until mid-October (**Fig 3e**).

Meropidae

On the SE Peninsula, we recorded passage of European Bee-eater Merops apiaster from early September to the first half of October, with a peak in the second half of September (Fig 3f). The maximum day count was of more than 2000 individuals on 18 September. During September and the first half of October the weather was sunny and hot and very high migrating birds were difficult to detect in the clear blue sky. Migrating Bee-eaters were often heard, but could not be found in the glare of the sky and therefore could not be counted – it is therefore realistic to suppose that a number of flocks passed undiscovered – but in any case, we heard flocks of migrating beeeaters at night (eg 22-24 September and 29-30 September). The actual numbers we counted migrating across the SE Peninsula exceed 1% of the European breeding population, which would meet the C3 criterion for an Important Bird Area (Waliczky 2000). The definition of the C3 criterion is: "a site known to be regularly used by at least 1% of the flyway of migratory species not considered threatened at the EU level". The C3 threshold for European Bee-eater is given as 13 000 individuals (Iezekiel et al 2004). This threshold was reached at Cape Greco from the number of counted birds alone, but it would be interesting to establish just how many birds were missed.

Laniidae

We recorded three shrike species during this study. From regular observations of birds remaining in the same place we established that these species often stop over for more than one day. The commonest species was Red-backed Shrike *Lanius collurio*, its migration peaking at the end of September (**Fig 3g**). Lesser Grey Shrike *L. minor* was a regular but early migrant, its migration ceasing at the end of September (**Fig 3h**). Masked Shrike *L. nubicus*, a regular breeder in Cyprus and a common passage migrant (Flint & Stewart, 1992), declined in numbers from mid-September but individuals continued to be recorded until the end of October (**Fig 3i**).



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Figures 3a-3I. Phenologies of common migrant bird species at the SE Peninsula of Cyprus, 3 September to 27 October 2005, depicting mean numbers of individual birds counted per day against pentad (5-day period, middle date shown). Species are: **a. Eurasian Stone-curlew** *Burhinus oedicnemus*; **b. Woodpigeon** *Columba palumbus*; **c. Eurasian Turtle Dove** *Streptopelia turtur*; **d. Common & Pallid Swifts** *Apus apus & A. pallidus*; **e. Alpine Swift** *Tachymarptis melba*; **f. European Bee-eater** *Merops apiaster*; **g. Red-backed Shrike** *Lanius collurio*; **h. Lesser Grey Shrike** *L. minor*; **i. Masked Shrike** *L. nubicus*; **j. Sand Martin** *Riparia riparia*; **k. Eurasian Crag Martin** *Ptyonoprogne rupestris*, **I. Barn Swallow** *Hirundo rustica*. Only those species observed at least on 50 occasions during the whole season are shown.

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Hirundinidae

Barn Swallow Hirundo rustica followed by Sand Martin Riparia riparia were the commonest hirundines recorded during the study (Figs 3j-3k), contradicting Flint and Stewart (1992) who gave Sand Martin as the most numerous of the family in Akrotiri. The Sand Martin phenology has two peaks, one around mid-September and the other around 7 October, possible explanations being the differing migration strategies of young birds and adults ("adults migrating faster than juveniles", Cramp & Simmons 1980) or the passage of two different populations – there is difference in the timing of migration between western and eastern populations (Cramp & Simmons 1980). There was a short but distinct migration of Eurasian Crag Martin Ptyonoprogne rupestris in the second half of October, the maximum daily count being of 233 individuals on 28 October (Fig 31). There appear to be no former reports of distinct autumn migration in Cyprus (Flint & Stewart 1992, Gordon 2004, Richardson 2005). Migration of Redrumped Swallow *Cecropis daurica* peaked in September but a sparse migration lasted until mid-October (Fig 4a). Relatively few Common House Martins Delichon urbicum were recorded (Fig 4b). Passage prior to the study period seems unlikely, as the largest flocks were reported in the west of the island in early to mid-September 2005 (Richardson in litt). Perhaps House Martins migrate at higher altitudes making them more difficult to observe than other hirundines (Flint & Stewart, 1992).

Alaudidae

The migration of Greater Short-toed Larks *Calandrella brachydactyla* peaked in the second half of September, although at the coast a few individuals were present during the whole study period. Our results show a second but smaller peak in mid-October (**Fig 4c**). The main numbers of Woodlark *Lullula arborea* and Skylark *Alauda arvensis* occurred in the second part of October (**Figs 4d-4e**). Both species are common winter residents (Flint & Stewart 1992).

Sylviidae

The passage of Eastern Olivaceous Warblers Iduna pallida peaked around 15 September and had completely ceased by mid-October (Fig 4f) – most individuals having departed before the study began (Flint & Stewart, 1992). The first Chiffchaff *Phylloscopus collybita* arrived in early October, but numbers increased steeply at the end of October (Fig 4g). Willow Warbler P. trochilus was one of the commonest migrants at the SE Peninsula, peak passage occurring in the second half of September (Fig 4h). During the study period, 11 Sylvia species were recorded: with the exception of the two vagrants, Asian Desert Warbler S. nana and Ménétries's Warbler S. *mystacea*, these represent all other *Sylvia* species recorded in Cyprus, a circumstance that underlines the importance of the SE Peninsula, including Cape Greco, for this genus. Sardinian Warblers S. melanocephala arrived in late October (Fig 4i). Now resident in the Akámas area of NW Cyprus, they remain primarily a winter visitor in variable numbers (Flint & Stewart 1992) and a regular passage migrant from late October to November (Shirihai et al 2001). The isolated record of a single bird on September 9 is a very early record. Lesser Whitethroat *S. curruca* was a very common passage migrant that peaked at the end of September and in early October, but because its passage lasted almost throughout the whole study period, it must have been one of the commonest of all migrants (Fig 4j). It is not surprising that this species is a very regular victim of lime-sticks (Horner & Hubbard 1982). Less abundant was Common Whitethroat S. communis, its migration peaking in the first half of September and ceasing almost entirely in early October (Fig 4k), a circumstance that differs slightly from that described by Flint and Stewart (1992), where peak migration was in late September and early October, but continued until the end of October. The



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phenology of Blackcap *S. atricapilla* shows two distinct peaks; the first around 20 September and the second around 20 October (**Fig 4l**). We observed no differences in sex ratio between the two peaks and so differences in the timing of migration between the sexes is not responsible for these two peaks. More likely is that the two peaks indicate the passage of different populations: southern populations tend to leave after passage migrants from northern populations have passed through (Klein *et al* 1973).

Turdidae

Many Song Thrush *Turdus philomelos* arrived within a few days around 20 October (**Fig 5a**); it is a very common winter visitor that suffers heavily from shooting (Flint & Stewart 1992).

Muscicapidae

European Robin Erithacus rubecula is a very common and widespread winter visitor (Flint & Stewart 1992) and most birds arrived in late October (Fig 5b). The phenology pattern of Black Redstart Phoenicurus ochruros was very similar to the former species (Fig 5c). The passage of Common Redstart P. phoenicurus peaked in mid-October but migration lasted until the end of the study (Fig 5d). Sometimes there were observations from the same place for 2 to 3 days in a row, probably indicating that some individuals rested longer than just a day. On the SE Peninsula Whinchat Saxicola rubetra was a common passage migrant from early September to the first half of October (Fig 5e). It reached its peak around 20 September with more than 50 individuals recorded each day. Eurasian Stonechat S. torquatus, a very common winter visitor, arrived in the second half of October (Fig 5f). During its arrival from mid-October to early November, the species seems to concentrate in the SE Peninsula (Flint & Stewart, 1992). Isabelline Wheatear Oenanthe isabellina, Northern O. oenanthe and Black-eared Wheatear O. hispanica were regular migrants around Cape Greco (Figs 5g-5i). Because there are only a few annual autumn records of Isabelline and Black-eared Wheatear for the whole island (Flint & Stewart 1992, Gordon 2004, Richardson 2005), our observations indicate the SE Peninsula is an important stopover place for these species. Blue Rock Thrush Monticola solitarius is mainly a winter visitor (a few are also resident) with very little evidence of autumn passage (Flint & Stewart 1992), but the phenology of our data suggests a scarce passage in October (Fig 5j). During autumn migration Spotted Flycatcher Muscicapa striata was the only regular flycatcher species (Fig 5k). Its migration peaked in the second half of September and ceased at the end of October.

Motacillidae

Of the pipits, Tawny Anthus campestris, Tree A. trivialis and Red-throated A. cervinus were common migrants at Cape Greco. The phenologies of the first two were very similar, but Red-throated Pipit was distinctly later (Figs 51, 6a & 6c). Meadow Pipit A. pratensis is a common and widespread winter visitor (Flint & Stewart 1992) and arrived at the end of October (Fig 6b). Yellow Motacilla flava (flava ssp were not systematically recorded) and White M. alba Wagtails were very common migrants at Cape Greco (Figs 6d & 6f). The former peaked around 25 September, the latter in the second part of October. We had many fewer observations of Grey Wagtail M. cinerea whose passage peaked around 10 October (Fig 6e).



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Figures 5a-5I. Phenologies of common migrant bird species at the SE Peninsula of Cyprus, 3 September to 27 October 2005, depicting mean numbers of individual birds counted per day against pentad (5-day period, middle date shown). Species are: a. Song Thrush *Turdus philomelos*; b. European Robin *Erithacus rubecula*; c. Western Black Redstart *Phoenicurus ochruros*; d. Common Redstart *P. phoenicurus*; e. Whinchat Saxicola rubetra; f. Eurasian Stonechat *S. torquatus*; g. Isabelline Wheatear Oenanthe isabellinus; h. Northern Wheatear O. oenanthe; i. Black-eared Wheatear O. hispanica; j. Blue Rock Thrush Monticola solitarius; k. Spotted Flycatcher Muscicapa striata, I. Tawny Pipit Anthus campestris. Only those species observed at least on 50 occasions during the whole season are shown.

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Fringillidae

The end of October saw the onset of arrival and passage of Common Chaffinch *Fringilla coelebs* (**Fig 6g**). The migration of this species was very conspicuous as flocks of *c*100 individuals were regularly seen passing Cape Greco and flying out to sea. Common Linnet *Carduelis cannabina* is a widespread resident (Flint & Stewart 1992) and so individuals were seen during the whole study, but at the end of October many migrants had arrived (**Fig 6h**).

Emberizidae

The only regular migrant bunting at the SE Peninsula was Ortolan Bunting *Emberiza hortulana*, whose passage peaked in the first half of September and ceased by the end of September (**Fig 6i**).

CONCLUDING REMARKS

The SE Peninsula and Cape Greco have proved to be not only an important resting place but also a significant flyway for a variety of migrant species. The numbers of resting warblers, in terms of species as well as numbers, are extraordinary, and the numbers of passing European Bea-eaters meet a criterion for possible designation as an Important Bird Area. I urge local decision-makers and organisations, such as BirdLife Cyprus, to consider the value and importance of the area of the SE Peninsula and Cape Greco for so many different kinds of migrant birds. The SE Peninsula and Cape Greco will require careful management to protect its wildlife, otherwise longdistance migrant birds will lose yet another important resting and feeding stopover on their long journey to and from their migration goal areas in Africa.

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Figures 6a-6i. Phenologies of common migrant bird species at the SE Peninsula of Cyprus, 3 September to 27 October 2005, depicting mean numbers of individual birds counted per day against pentad (5-day period, middle date shown). Species are: **a. Tree Pipit** *Anthus trivialis*; **b. Meadow Pipit** *A. pratensis*; **c. Red-throated Pipit** *A. cervinus*; **d. Yellow Wagtail** *Motacilla flava*; **e. Grey Wagtail** *M. cinerea*; **f. White Wagtail** *M. alba*; **g. Common Chaffinch** *Fringilla coelebs*; **h. Common Linnet** *Carduelis cannabina*, **i. Ortolan Bunting** *Emberiza hortulana*. Only those species observed at least on 50 occasions during the whole season are shown.

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