4-6 March 2002

Station biologique de la Tour du Valat

2nd Mediterranean Greater Flamingo Workshop

PROCEEDINGS

Compiled by Arnaud Béchet

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FOREWORD AND ACKNOWLEDGEMENTS

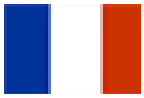
This document reports the results of the 2nd Mediterranean Greater Flamingo workshop which was held from 4 to 6 March 2002 at Station Biologique Tour du Valat.
A first part summarizes the main topics discussed with decisions of collaboration.
A second part compiles selected contributions from the participants.
The publication of these proceedings was made possible by a financial support of the Regional Activity Center for Specially Protected Areas (RAC/SPA).
A pdf version is available at www.tourduvalat.org.

Acknowledgements

I wish to acknowledge Christophe Barbraud and Alan Johnson who made the organization of this workshop possible. I am grateful to all the participants who made the workshop such an exciting experience and allowed to put forward the steps for an enthusiastic international collaboration.

Arnaud Béchet

List of participants



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Fuente de Piedra
Manuel Rendón Martos
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Research on the Greater Flamingo in the Mediterranean Basin and West-Africa: Where are we?

Arnaud Béchet

The Greater Flamingo's breeding biology is known and described over a wide range of sites, from natural to strictly managed one. For instance, in Turkey, flamingos regularly breed on the remote islands of a natural brackish lagoon (Tuz lake) whereas in France flamingos have bred continuously on the artificial island of the Fangassier, in commercial salt pans since 1974. The breeding is intermittent at some sites either because of water level variations or because of disturbances such as the divagation of dogs at Molentargius (Sardinia), for instance.

Turkey seems to be an area of great importance for the flamingos of the eastern Mediterranean with several known breeding sites but little or no monitoring. Furthermore, Turkey could make the link between Asian and Mediterranean populations of flamingos.

There seems to exist a good correlation between the variations of foraging sites quality in Mauritania a given year (upwelling conditions) and the number of birds present in the breeding sites of the western Mediterranean the same year, that is to say that if the conditions are good in Mauritania, the flamingos will breed there reducing the number of flamingos present in the Mediterranean colonies. This tendency must be put in perspective with the fact that local variables such as water levels at breeding sites also influence colony size at Fuente de Piedra or at the Fangassier.

Thus, it comes from this meeting that the monitoring of known breeding sites has been considerably improved in recent years, however breeding biology and especially dispersal among breeding sites remains poorly studied. As conservation issues remain important for this species, our efforts should focus on linking national research programs in a common project articulated around the study of dispersal. It is thus proposed to set up a quadripartite collaboration between Spain, Italy, Turkey and France.

Specification of the periods of intense band resightings

In order to improve the quality of the data to be used in capture-recapture models, it was proposed to concentrate resighting efforts over 3 periods: 1 – reproduction = from March to August, 2 – immediate post breeding dispersal = the first two weeks of September and 3 – wintering = last two weeks of December and January.

Banding

It was proposed to continue banding at the main breeding sites and to increase observation pressure on "satellite" breeding sites. It was also proposed to increase resighting pressure and if required to start to band Flamingos in Turkey and Mauritania.

Homogenisation of colour band characteristics

From now on, all colour bands will be made of black figures on white plastic. A bar will follow the first letter to indicate the direction of reading. Letters and figures will be allotted to each country.

Genetics

The use of genetic microsatellites seems to be well adapted to study the remote dispersal of flamingos. In particular, the observation pressure being very low in southern Africa and in the Middle East, the banding of flamingos will give only little information on the links between the birds breeding in the western Mediterranean and those breeding more to the south or the east. Michel Raymond and François Rousset suggested that a sampling of at least 30 individuals (blood test on adults or chicks) by breeding colony would allow to provide answers to this kind of question.

Database

The Spanish data (banding and resightings) were integrated with the French ones in a common database. The Italian data will be integrated in the coming months. Paolo Dall'Antonia, Charina Cañas and Christophe Germain will be responsible for this common database which will be updated once per month by an import-export protocol. It is proposed that in the near future there could be only one database which could be updated by the database managers through a web interface.

Homogenisation of data collection

Several questions must still be discussed concerning the homogenisation of the measurement of various parameters (e.g.: tarsus length; colony size, behavioural parameters).

Convention

A convention will be written and will be proposed to the four partners in order to establish their role and responsibilities in the collaboration.

Respective interests of research and conservation

Partners of the collaboration specified their interests for future research especially with regard to the use of the common database. In summary:

Juan Amat
- Effects of population growth on dispersal.
- Analyses of the distribution of different cohorts from natal dispersion to recruitment.
- Follow-up of individual life-histories.

Manuel Rendón Martos
- Influence of the colony type (natural/artificial) on its dynamics.

Uygar Özesmi
- Assistance with neural network modelling and/or individual based models.
- Flamingo conservation in Turkey.

Alan Johnson
- Flamingo Specialist Group coordinator.
- Collaboration with Uygar Özesmi to establish an update of the status of flamingo populations in Turkey.

Alessia Atzeni
- Guarantee the resightings required by the collaboration.
- Improve the spatial coverage of breeding site survey in Sardinia.

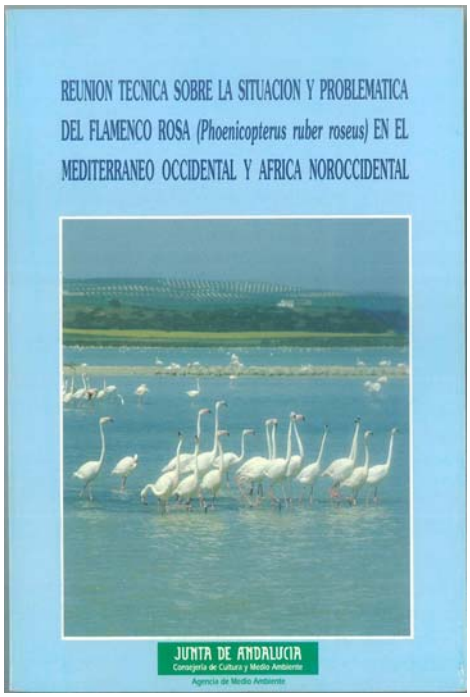
Nicola Baccetti
- Study of the origin of flamingos occupying a given wintering site.

Christophe Barbraud
- Cost of reproduction.

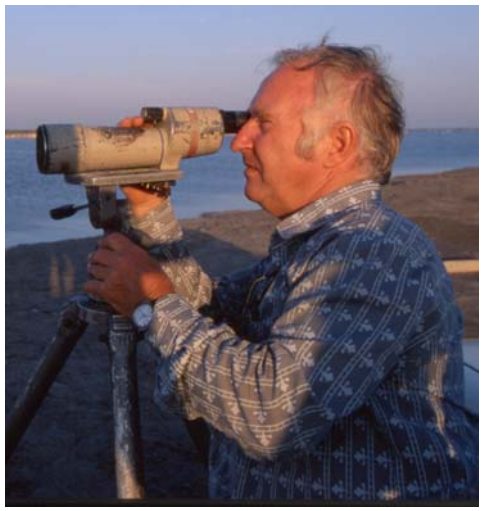
Arnaud Béchet
- Spatially explicit recruitment probabilities (influence of the despotic distribution and of artificial sites on the probability of first breeding).
- Breeding propensity.
- Modelling population dynamics : influence of the spatial and temporal stabilization of breeding sites.
- Influence of environmental variations on the Mediterranean population.

A word of introduction
Alan Johnson (Chair)

The Chairman, who retired from the Tour du Valat at the end of 2001, thanked Jean-Paul Taris and the Tour du Valat on behalf of all participants for hosting the meeting. He also thanked the participants for attending and noted that all who were invited were present. Although no longer a member of the Tour du Valat staff, the Chairman remains for the present coordinator of the Flamingo Specialist Group of Wetlands International, and intends to continue investing time in flamingos in the future, both in the field and in the office. Christophe Barbraud also left the Tour du Valat at the end of last year to join the CNRS in Chizé in the west of France. Christophe's interest in flamingos has not wained and he has taken a leading role in the organisation of the present meeting. One Christophe has now left the team at the Tour du Valat and another one has joined- Christophe Germain who began working with the database in September 2001. Arnaud Béchet is now responsible for the running of the flamingo project at Tour du Valat.



Proceedings of the first international workshop on flamingos in the Mediterranean, Antequera (Spain), 1989


Alan Johnson

The first international workshop on flamingos in the Mediterranean took place in Antequera, Spain in 1989. The papers presented and the conclusions and recommendations of that meeting were published by the Junta de Andalucia in 1991 (Reunión Técnica sobre la situación y problematica del Flamenco rosa (*Phoenicopterus ruber roseus*) en el Mediterráneo occidental y Africa Noroccidental). The present workshop is, therefore, the 2nd international meeting dealing with flamingos in the Mediterranean region. It is clearly more specific than the first because it is a meeting of partners involved in the development of a project which we hope will develop into a strong partnership between several countries and several organisations. We also hope that it will be followed by other meetings, hopefully in other parts of our region and perhaps with more partners.

Although this meeting is an important one, we hope that the atmosphere will remain informal and that each person will take an active part. We have decided that English is the language which most participants can speak but we are fully aware that the four countries represented here each has its own language. When necessary, informal translations will be made. It is my intention to circulate the minutes or proceedings of this meeting in the newsletter of the Flamingo Specialist Group.

Recommendations for a flamingo multisite design

Roger Pradel

The capture-resighting (CR) histories of animals individually marked on their first encounter and subsequently reobserved on several sites allow the study of natal and breeding dispersal **among these sites**. The restriction means that, from the sole CR data, it will not be possible to estimate the amount of exchanges with the 'outside' and that animals that leave definitively the set of monitored sites are undistinguishable from dead animals. Supplementary information as from radio tracking can be considered but with carefully chosen sites this should not be absolutely necessary.

There are a number of desirable features of the monitoring design in order at the same time to take into account the limitations of the method, accommodate the model's assumptions, and make the numerical procedures perform well. Some are relatively obvious and have been discussed extensively during the meeting:

1. **Marks** should not be lost, nor misread. The second point is particularly critical.
2. All observers should use exactly the same **criteria**, in particular to ascertain the breeding status of a bird. A limited number of codes for the observations on which everybody agrees may be preferable to a long list.

Other important points are:

3. The **set of monitored sites** should be as comprehensive as possible to avoid too much 'leakage'. At the same time, the number of sites should be kept low because a great number of sites may dilute the effort excessively and will multiply prohibitively the number of parameters in the model rendering the numerical procedure unstable. Spain, Italy, France, Turkey, Mauritania seem desirable. I believe 5 or 6 sites is a good target at this stage. Within each country, avoid screening a given area for some years then moving to a different area. Rather try to identify the site where most of the flamingos go. If there are two sites equally frequented, they might be followed in parallel trying to keep a comparable resighting pressure on them each year. They can then be treated as just one site in subsequent analyses.

Observation in Spain

4. The **resighting pressure** should be high enough on each site because a locally low resighting pressure will lead to unstable and very imprecise estimates of exchanges with this site. I believe Turkey is probably more isolated (fewer exchanges) than the rest of the sites and thus resighting pressure there is particularly critical. Also, the inclusion of Mauritania seems excellent to learn more about the yearly cycle but this will be useful only if there is strong resighting pressure. A resighting pressure of 20% on each site is a reasonable target. It is also a good idea to have a measure of resighting effort (men x hours, visibility…).
5. Lengthy **periods** of observations are not desirable (models actually make the assumption that the observations take place at just one date each year). In practice, the observations should be concentrated during the peak of the season on the site (2 months is OK, 3 months acceptable).
6. Models make the assumption that all animals are identical (same survival, same resighting probability, same rates of movement) within each recognizable group. Thus, sources of **suspected differences** such as sex should be noted.

To summarize, *the information should be homogeneous. Quality should take precedence over quantity.*

Preliminary work on breeding dispersal in the western Mediterranean and some insights into the metapopulation dynamics

Christophe Barbraud

Dispersal is a major process in population ecology which strongly influences population dynamics on both a local and regional level as well as the variation in genetic composition. However, variations in dispersal rates and factors affecting those rates are still poorly understood among birds. Here, we describe the pattern of colony faithfulness and dispersal in the Greater Flamingo *Phoenicopterus ruber roseus* breeding in the western Mediterranean during a 14-year period. We studied geographical and temporal variations in movements and survival of individually marked birds between their most important breeding colonies (Camargue, France; Fuente de Piedra, Spain; Molentargius, Sardinia), using capture histories of 3,000 breeding birds and multistratum capture-recapture models. These sites differ in the frequency with which they offer suitable breeding conditions. Flamingos have bred each year in the Camargue since 1972, but only in 18 of the past 29 years at Fuente de Piedra, whereas they only started to breed since 1993 in Sardinia. The higher colony site fidelity was found for the less variable environment (Camargue) with only 3.6 % of breeding individuals dispersing annually. At Fuente de Piedra higher rates of breeding dispersal were found (10.4 %), and dispersal was related to the amount of winter rainfall in southern Spain (dispersal up to 26% during dry winters). Highest dispersal rates (37.2 %) were found for the Sardinian colony, which was the smallest (c. 1,000 breeding pairs compared to 8,000 for Fuente de Piedra and 14,000 for Camargue) and the more disturbed colony. During the study, variations in overall breeding numbers seemed to be partly determined ($r^2 = 0.35$, $p = 0.006$) by early spring sea-surface temperature anomalies associated with the upwelling off the western coast of Mauritania, a major wintering and breeding site for this metapopulation. We suggest that when upwelling conditions (which enhance productivity) occur in early spring, a significant part of wintering flamingos breed in Mauritania causing a decline in breeding numbers in western Europe.

First breeding at Molentargius, Sardinia (1993)

Flamingos in Turkey: status and research

Uygar Özesmi

Turkey became involved in the Flamingo meta-population project initiated by Station biologique de la Tour du Valat in July 2000 when Alan Johnson and Robert Bennetts visited Turkey. We met at DHKD Office in Ankara and at Erciyes University. A decision was taken that Turkey would become a partner in this project. During this visit we visited Seyfe Gölü, Sultan Marshes, Tuzla (Palas) Gölü, Tuz Gölü (with Jose Tavares) and assessed the feasibility of ring reading. About 8,000 flamingos were seen on this visit in Seyfe Lake.

Looking at past research in Turkey

In 1966 juveniles were recorded in Tuz Gölü, and finally in 1970 Warncke discovered a colony of 5,000 nests 4 km within the lake on an island. The same year, Nihat Turan and Klaus Warncke also found 1,500 pairs of flamingos breeding in Sultan Marshes. The breeding colony in Tuz Gölü is the largest in Turkey. Aerial surveys in 1991 showed 11,000 nests, and 4,000 chicks in total; in 1992, 14,000 chicks; in 1998: 12,000 pairs minimum; and in 2000, 8-10,000 chicks. Tersakan Gölü is the main feeding area for this population where 12,000 birds were counted on 22.06.1998. Another important breeding site is Çamaltı Tuzlası where between 1982 and 1988, 100-150 pairs were breeding. In 1990, 600 pairs were breeding, and 500 chicks were raised; in 1991, at least 300 pairs; in 1995, 1,450 pairs were breeding unfortunately later the colony was abandoned. In 1996, 250-300 pairs were breeding but failed and breeding failure continued till 2000 with up to 450 pairs attempting to breed. Major threats in the area include expansion of Salt Pans and poaching. Recently a UNDP – GEF – SGP Project was initiated with Mehmet Sıkı and the Chamber of Environmental Engineers. The project includes activities on awareness and education, monitoring of bird populations and a participatory building of a new flamingo island and also an observation hide.

Breeding of flamingos is also known from Ereğli Sazlığı where it is rather irregular: 35-40 pairs bred in 1986, 300 pairs in 1993 (however later abandoned), 20 pairs in 1998. Breeding at Seyfe Gölü is also not very well known and believed to be rare, in 1992 about 1200 nests, 150 chicks were observed.

Acıgöl is another breeding site of flamingos. Main feeding areas for the species include: Seyfe, Sultan Marshes (usually around 20000 birds), Çöl Gölü, Hotamış, Kulu Gölü (usually around 5000 individuals wintering population drops to 100-500).
In winter the IWC (International Waterfowl Count) totalled 20,583 birds in 1996, 51,755 birds in 1999, however it is common to see e.g. 20,000-80,000 birds in Sultan Marshes when there is water.

Aerial photograph of the colony at Tuz Gölü (Turkey)

Largest number of flamingos over winter at the coastline along Homa Dalyanı and Bostanlı - Çil Azmak Dalyanı. Unfortunately, this area is outside of what we call "Çamaltı Tuzlası" and is not a protection area.

Recently new important bird areas (IBAs) for wintering of flamingos have been: Ayvalık – Tuzla, Milas – Tuzla, Gökçeada Lagoon where they all winter at numbers larger than 800. There are about 20 flamingo ring recoveries from Turkey all originating from Kazakhstan and Iran. These are mostly of wintering populations from these areas. Dr. Jose Tavares (RSPB) has collated these records and is willing to share them with interested people. Alan Johnson read 5 rings in 1991 at Çamaltı Tuzlası from which 1 travelled Camargue - Cyprus - Greece - Turkey, 1 Camargue -Sardinia - Turkey, 3 travelled Camargue -Turkey. In 1992, he read 2 rings from the Camargue and 1 from Fuente de Piedra at Seyfe.

Movements of flamingos are well known within the Western Mediterranean however little is known about the Eastern Mediterranean movements of flamingos. The joint project might shed some light into this. The work can be facilitated through amateur bird-watching clubs which now have an increasing number of members in Turkey and are also becoming more widespread.

Crèche at Tuz Gölü, Turkey (1992)

References:

Alan Johnson and IUCN Flamingo Working Group Reports.

Warncke, K. 1970. Beitrag zur Vogelwelt des Zentralanatolischen Beckens. Die Vogelwelt 91:176-184.

Warncke, K. 1971. The Flamingo (Phoenicopterus ruber) – a new breeding bird for Turkey.

Eken, G., Magnin, G. 1999. A Preliminary Biodiversity Atlas of the Konya Basin, Central Turkey. Biodiversity Programme Report – No:13 DHKD, Istanbul.

Ground survey at Seyfe Gölü, Turkey (1992)

Research on the Greater Flamingo in Spain

Juan A. Amat, Miguel A. Rendón, Manuel Rendón-Martos and Araceli Garrido

A review on scientific research on the Greater Flamingo in Spain was presented. The former reports were descriptions of some breeding colonies and compilations of winter counts. Marking with PVC bands for identification of individual birds started in 1986 in Fuente de Piedra lake and continues at present; chicks have also been occasionally marked in other colonies.

During 1984-1996, a population study at Fuente de Piedra was conducted by Rendón-Martos, who showed that there is a relationship between autumn-winter rainfall in Marismas del Guadalquivir and colony size at Fuente de Piedra. This may be because many flamingos that breed in Fuente de Piedra spend the previous winter in Marismas, where they improve their body condition, and also because most Greater Flamingos (about 85-90%) breeding in Fuente de Piedra lagoon move to Marismas del Guadalquivir to forage during the chick rearing period when the lagoon dries out.

El burro—Doñana, Spain

From 2000 to present we have been involved in projects on habitat use by breeding flamingos, parental care strategies and chick dispersal. We have used transmitters to track the movements of breeding birds during chick rearing; our preliminary results show that parents visit the breeding site every 4-6 days to provision their chicks. Most breeding birds exhibit a strong fidelity to particular foraging areas when they are provisioning their chicks, and use wetlands located within 200 km of the breeding site, although a few individuals may move up to 400 km. During 1996-2001 we took blood samples of chicks to relate plasma chemistry values to body condition and dispersal.

Food sampling at Fuente de Piedra, Spain

Geographic and temporal scope in the focus of biological and conservation questions

Arnaud Béchet

Objectives

- *Precise biological and conservation questions regarding the Greater Flamingo metapopulation*
- *Define sampling scale to answer these questions*
- *Precise tools adapted to the geographic and temporal scale considered*

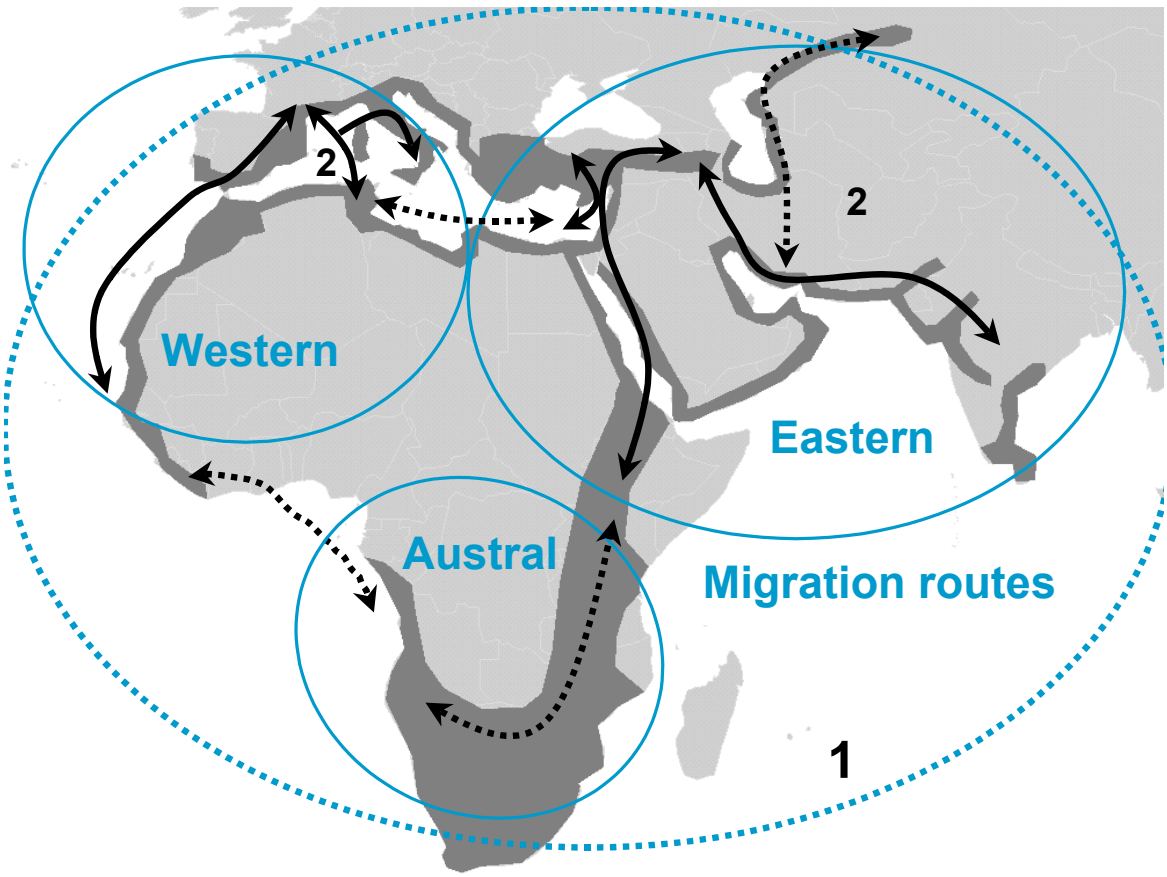
Because of the evidence of the dispersal of flamingos within the Mediterranean basin, two types of questions arise:

1) what are the geographical limits of the metapopulation considered,
2) what is the level of juvenile and breeding dispersal within the Mediterranean?

Limits of the metapopulation

To define the limits of the flamingo metapopulation, one can use several indirect methods. Genetic markers such as microsatellites could be used to provide an image of past and, in some circumstances, ongoing exchanges among populations (gene flow / effective dispersal). It will require blood sampling of juveniles at banding sites.

Using stable isotope variations (δ13C, δ15N, δ 34S, δ D, δ 87Sr) in feathers found at different sites is another techniques that could be useful to provide an image of present (year round) distribution (e.g. localisation of the wintering areas of adults breeding at different colonies). It will require feather sampling (e.g. at colonies or moulting sites after reproduction). This method however requires a precise knowledge of moulting chronology.



Geographic range of the Greater Flamingos (dark grey) with the identification of the geographic scope of the two questions (1 & 2 see text for details) adressed by the metapopulation project.

Dynamics of the Mediterranean populations

Direct and indirect methods can participate to estimate both juvenile and breeding dispersal of flamingos in the Mediterranean. Colour ringing and resighting twinned with multi-strata capture-recapture modelling will allow to estimate both parameters at main breeding sites (i.e. where resighting efforts are sufficient). Satellite tracking studies can also allow to better understand dispersal strategies as well as stopover use during movements (migration and dispersal).
The parameters obtained will be natal philopatry, spatially explicit recruitment probabilities, breeding fidelity and dispersal, true breeding propensity and true adult survival.

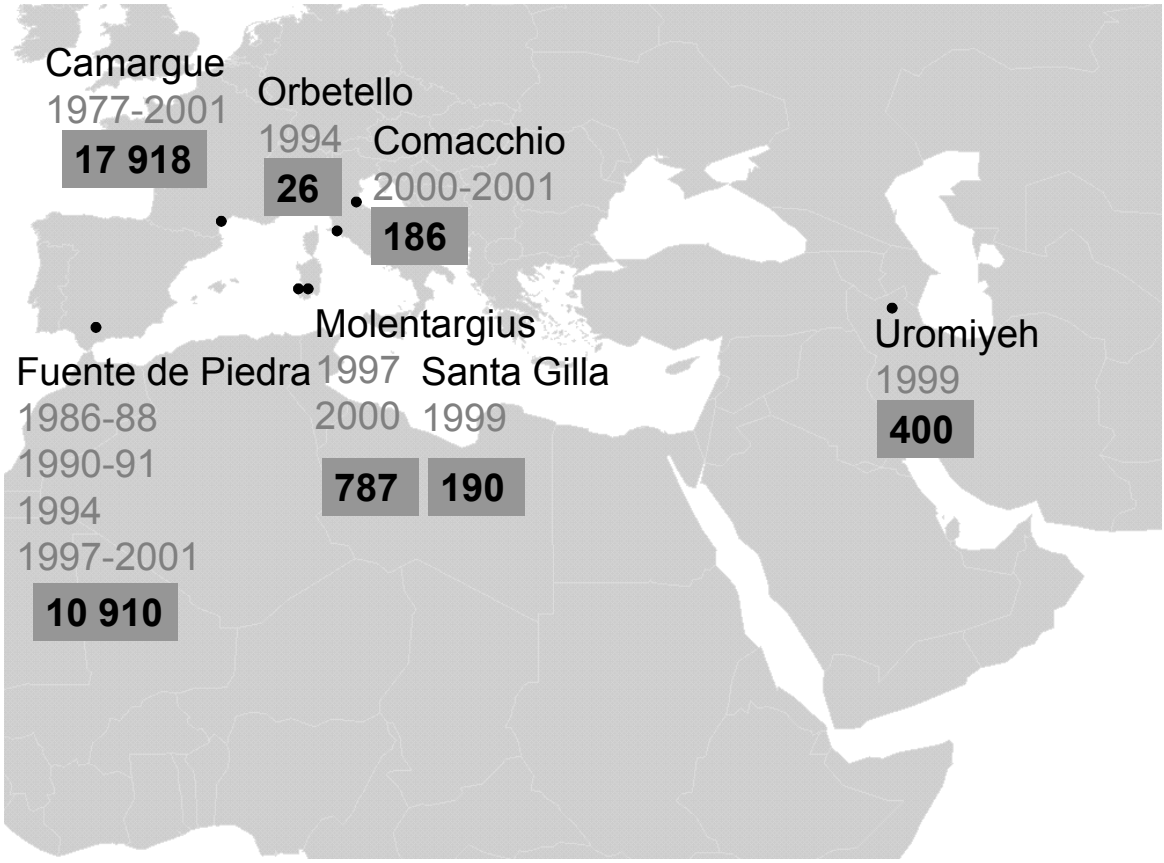
Extension of the banding scheme

The banding of flamingos has taken place at 7 different sites in 4 different countries.

For the future, the priority will be to increase PVC (& metal) banding, re-enforce present banding/resighting efforts at main breeding sites (Fuente de Piedra and the Fangassier), re-enforce winter resightings (December-January) in North Africa and Mauritania. It will also be possible to extend colour banding to Turkey and Mauritania. Finally it is suggested to increase resightings at satellite breeding sites (e.g. Ebro, Orbetello…) but not to involve too much in banding.

Behavioral ecology

More generally, studying the behavioral ecology of reproduction, wintering and foraging will remain important. These studies should rely on local funding and may be based on resightings of colour-banded birds at colonies or foraging areas and/or by tracking radio-tagged birds.



Years of banding and total number of flamingos banded at each site, 1977-2001

Marking schemes

Arnaud Béchet and Nicola Baccetti

As banding will be carried on in the most important colonies of our respective countries, it is essential to plan the characteristics of the bands and their engraved alphanumeric codes that should be used in the future.

Objectives

The broad objective of this proposal is to offer a simple framework that could be used as a tool by each banding team to foresee the making of the bands for at least the next ten years.

The specific objectives of the proposed scheme are:

- To facilitate database fusion.
- To enhance reading reliability.
- To avoid reading errors.
- To maintain the interest of amateur observers by an easy and immediate detection of the country of origin of the bands.
- To give each project equal reading probabilities.

Recognized problems and proposed solutions

Colours

White numbers on a dark background can be difficult to read due to the mud that fills the letters.
We thus encourage the use of black letters on a clear background (either yellow or white).

Reading direction

Some combinations of letters can be read in both directions (e.g. XNH can also be read HNX).
The Spanish technique, which use a bar after the first letter, automatically gives the reading direction and we propose to extend this to the colour bands of other countries.

Characters to use

Present characters that can be encountered:

From France:
Numbers : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
Letters : A, B, C, D, F, H, J, L, N, P, S, T, V, X, Z
(not used or no longer used : E, G, I, K, M, O, Q, R, U, W, Y.)

From Spain:
Numbers 1, 2, 3, 4, 5, 6, 7, 8, 9
Letters : A, B, C, D, F, H, I, J, K, L, M, N, P, R, S, T, U, V, X, Z
(not used: E, G, O, Q, W, Y)

From Italia:
Letters : A, B, C, D, F, H, J, K, L, N, P, S, T, V, X, Z
(not used : E, G, I, M, O, Q, R, U, W, Y and X [from 2002])

From Sardinia:
Letters : A, B, C, D, F, H, J, L, M (only as first letter), N, P, S, T, V, X, Z
(not used : E, G, I, K, O, Q, R, U, W, Y)

Problems :

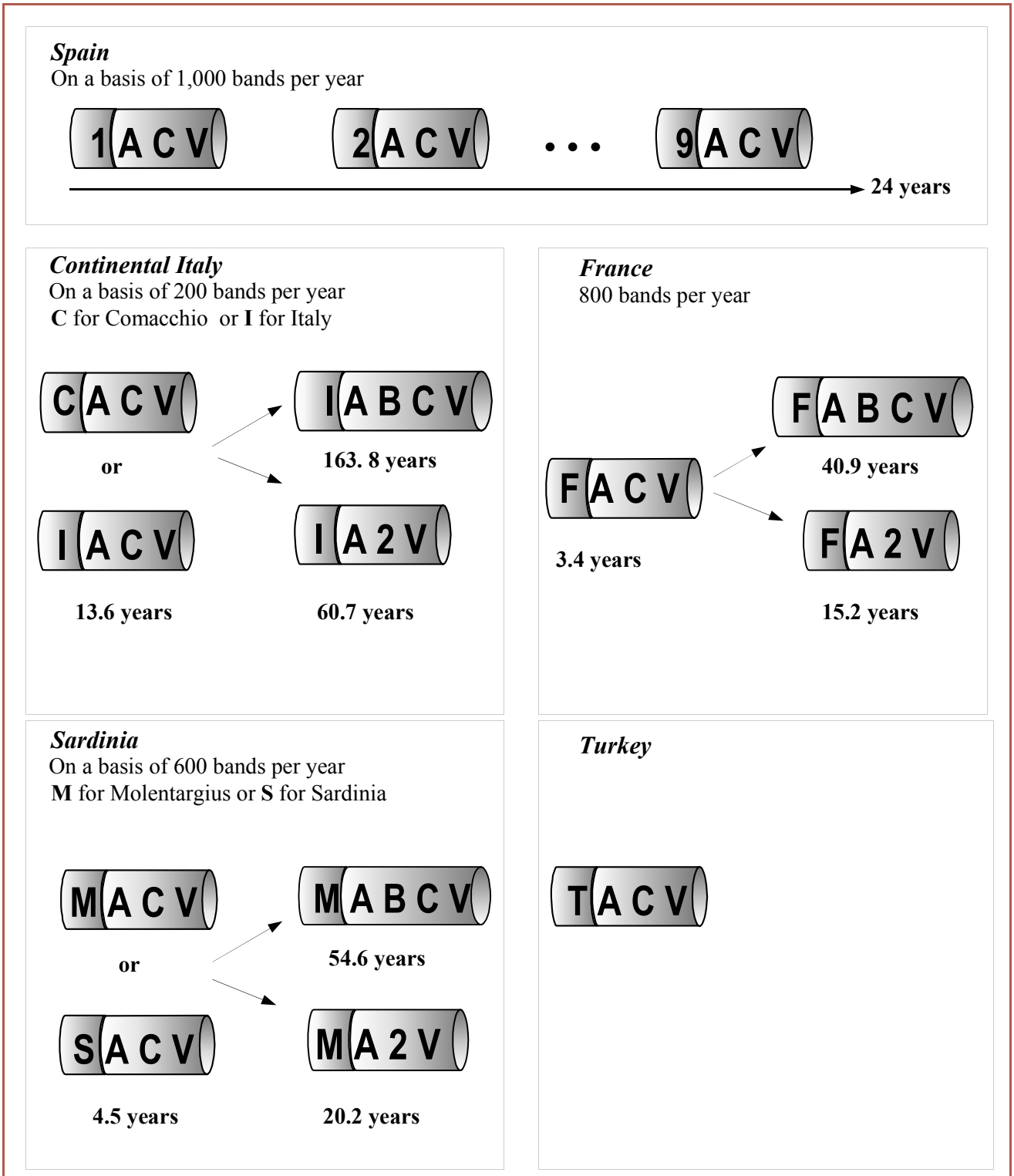
Numbers are difficult to read.
Mixtures of letters and numbers are even worse.
We recommend to avoid the use of numbers and to use only the 15 following letters
A, B, C, D, F, H, J, K (or X), L, N, P, S, T, V, Z

Proposition of marking scheme for the future

- Letters in black on a clear background (yellow or white).
- Start all colour bands by a bar after the first character. The first character would indicate the place of banding.
- Avoid the use of the following letters : E, G, I, M, O, Q, R, U, W, X, Y.

The following proposed scheme is thus based on the use of only 15 letters. However, we also considered the possibility to combine letters and numbers in order to avoid the addition of a supplementary character (with the necessary increase of band length) when all permutations of 3 letters will have been used.

There are 2,730 permutations of 3 letters among 15, 32,760 permutations of 4 letters among 15 and 12,144 permutations of 3 characters chosen among a mix of 15 letters and 9 numbers.



Summary of the different options for banding flamingos in the Mediterranean

Flamingo ringing in Italy: a comment after six campaigns

Nicola Baccetti and Paolo Dall'Antonia

In less than a decade, since flamingos successfully started breeding in Italy (1993: Cagliari, Sardinia), six ringing campaigns were carried out, for a total of 1,195 chicks marked in 1994-2001. Red engraved bands, readable in the field, were used on Sardinian birds (Cagliari), blue ones on birds banded at two peninsular localities (Orbetello and Comacchio).

Table 1 provides, for each operation, some details on the results achieved: 610 individuals were reported at least once (till the end of year 2001), mainly by band reading of living birds. Reporting rates varied between 28% and 93%, being usually low for the Sardinian birds due to a less intense local reading pressure and to the more difficult readability of the red bands *vs* blue ones. Birds reported as dead (or injured) mainly referred to one of the Sardinian sites (Molentargius) and to Comacchio, that are both crossed by aerial power lines, a cause of mortality for recently fledged birds as well as for flamingos of older age.

The resighting rate obtained on the banding areas of each cohort (Table 2) confirms that the local reading pressure at the ringing sites is an important source of variation for the general results commented above, and shows that in the best monitored situations nearly all ringed birds were re-observed, apart those known to be dead.

Not surprisingly, the number of ring reports received in each year, often equally shared by national controls and observations from abroad, increases with the growing total of marked birds (Fig. 1). The database of the resightings is featured by a large number of observers who provided very few records, and a small number of people who read really many rings (e.g. less than 20 readers recorded more than 50 rings each, Fig. 2). This, rather than a reverse ratio, shows a promising substrate for the future, if an efficient feedback (fast circulation of the life-histories) will keep the observation network motivated and stimulated to regularly look for ringed birds.

Although the relatively young age of our ringed birds seems a valid reason for the shortness of their life histories (more than half of the life-histories are composed by one or two sightings only), several birds were already seen many times (Fig. 3), with records spread across the European coast from eastern Greece to central Portugal, and the African coast from Cyrenaica, Libya, to Mauritania..

Table 1 : General results of the flamingo banding campaigns in Italy : totals, reporting rates and mortality. The number of fledged chicks is shown only for sites/years where ringing took place.

Ringing		N fledged	N ringed	N individuals reported		N dead at fledging		N dead later		N injured/ill	
Place	Year										
Laguna di Orbetello	1994	26	26	24	92.3%	0		0		0	
Cagliari-Molentargius	1997	2004	404	273	67.6%	29	7.2%	4	7.2%	4	1.0%
Cagliari-Macchiareddu	1999	800	200	104	52.0%	0		0		0	
Cagliari-Molentargius	2000	2700	383	108	28.2%	5	1.3%	1	0.3%	2	0.5%
Saline di Comacchio	2000	68	66	62	93.9%	2	3.0%	1	1.5%	1	1.5%
Saline di Comacchio	2001	300	116	39	33.6%	0		1	0.9%	0	
Total		5898	1195	610	51.1%	36	3.0%	7	0.6%	7	0.6%

Table 2: Band-reading pressure on the banding areas (dead/injured birds were excluded). N inds observed refers to all sites, the following columns to the banding sites only. Percent values refer to the respective banding totals.

Ringing		N inds observed	N observed within 1 year		N observed within 2 years		N observed up to Dec. 2001	
Place	Year							
Laguna di Orbetello	1994	24	24	100.0%	24	100.0%	24	100.0%
Cagliari-Molentargius	1997	273	46	18.9%	55	22.6%	76	31.3%
Cagliari-Macchiareddu	1999	100	22	22.0%	23	23.0%	24	24.0%
Cagliari-Molentargius	2000	100	22	22.0%	23	23.0%		
Saline di Comacchio	2000	60	58	96.7%	58	96.7%		
Saline di Comacchio	2001	(39)	(15)	(38.5%)				

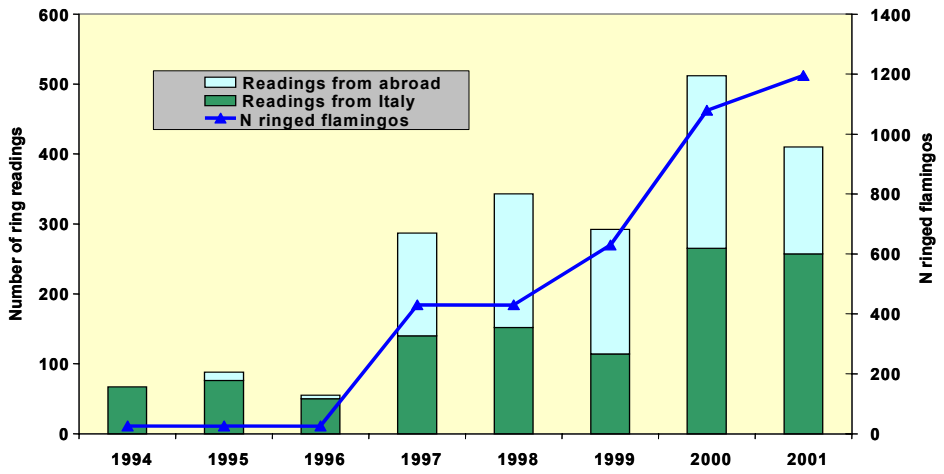


Fig. 1: Number of Italian-banded flamingos and yearly totals of band reports obtained.

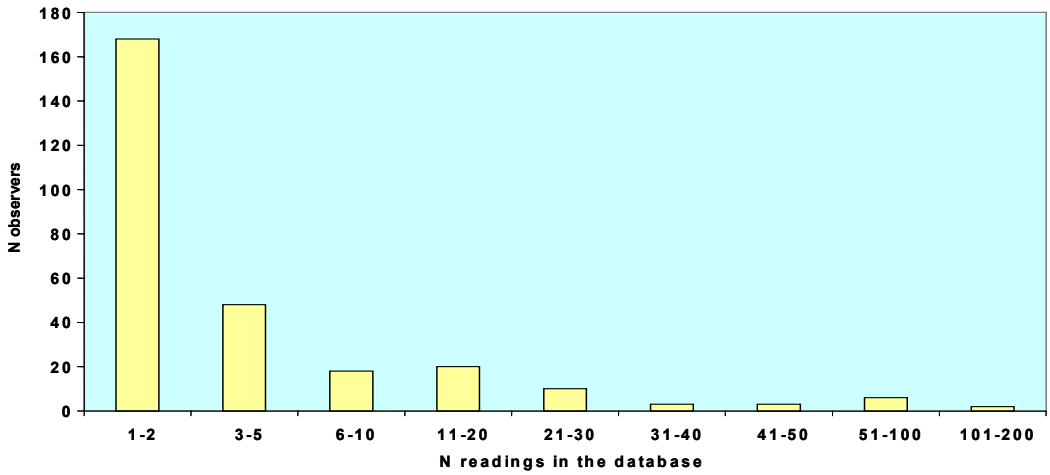


Fig. 2: Distribution of the numbers of Italian band readings per observer

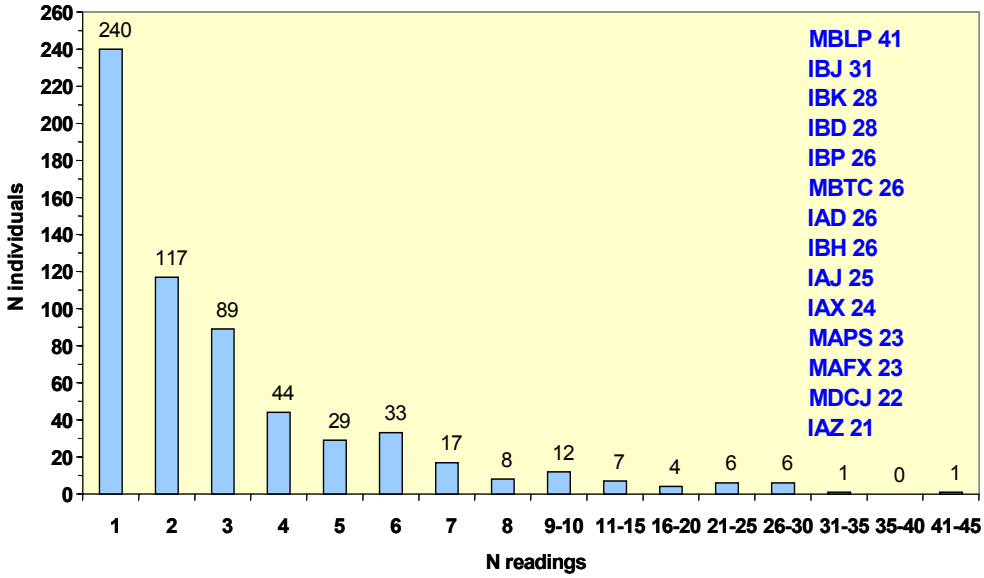


Fig. 3: Distribution of the number of band readings per bird.

Flamingo ringing in Italy—1994—2001

Flamingo breeding site management

Manuel Rendón & Alan Johnson

Manuel Rendón and Alan Johnson gave a 45 min. illustrated talk on the conservation and management of the flamingo breeding islands in Fuente de Piedra and in the Camargue respectively. Details of these projects have been published (Rendón Martos & Johnson 1996, Perennou et al 1996) and are not repeated here.

The work done in the Camargue over three decades could not have been accomplished without the full support of the salt company, owners of the Etang du Fangassier.

References:

Rendon-Martos, M., and A. R. Johnson. 1996. Management of nesting sites for Greater Flamingos. Colonial Waterbird 19 NSP1167-183.

Perennou, C., N. Sadoul, O. Pineau, A. Johnson, and H. Hafner. 1996. Management of nesting sites for colonial waterbirds. (Skinner, J. and A. J. Crivelli, Eds.). Tour du Valat. Arles, France.

Flamingos in other Mediterranean countries

Alan Johnson

Alan Johnson summarised the status of flamingos in those Mediterranean countries not represented at the meeting. Tunisia, Algeria, Morocco, Egypt, Libya, Cyprus, Portugal and Greece (including Lesvos and Samos) are all host at times to large numbers of flamingos and most, except Egypt and Libya, take part in the IWC (International Waterfowl Census) in mid-January. Resighting effort of banded birds is quite good in Tunisia, Morocco and Portugal but poor or absent from the other countries.

Flamingos formerly bred in Morocco, they occasionally breed or attempt to do so in small numbers in Egypt and Greece and they nest in large numbers in Tunisia following winters of high rainfall.

Nest building at the Etang du Fangassier, Camargue, France

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Bill patterns