

THIRTY YEARS OF CRANE COLOUR BANDING IN EUROPE: OVERVIEW AND PERSPECTIVES

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ABSTRACT

In March 1988, the three-colour-code currently used to mark Common Cranes (*Grus grus*) was employed for the first time in Spain. This banding system had been proposed by Spanish researchers at the First Meeting of the European Crane Working Group in 1985 in Hungary, as an alternative to the harder-to-read alphanumeric rings. Between 1988 and 1992, the first 109 cranes were colour-banded with this new system at Gallocanta lake. During the Palaearctic Crane Workshop, Estonia 1989, this banding system was definitely accepted by the European Crane Working Group. In 1995, the German Working Group invited the Spanish team to introduce the new system, as well as radio-tagging techniques, during a chick-marking campaign in Germany, and since then, similar campaigns to establish the new three-colour codes were carried out in several European and Asian countries. Hundreds of resightings of marked cranes soon accumulated in a database first coordinated by the Spanish Working Group, who also provided the colour rings. In January 2009, the website iCORA was opened by the German Working Group, and today ca. 140,000 resightings of more than 3,800 marked cranes are stored in that database. However, not all observers send their data to iCORA, and much information is stored in national ringing centres, or in the well-established EURING databank. During the last three decades, researchers and volunteers from all over Europe have been involved in crane banding and resighting activities, and today the data accumulated on life history parameters and use of migratory routes could hugely increase our knowledge of the species' biology. However, little information has been published as scholarly articles, and media outreach of crane banding results is also clearly insufficient. Here we propose a joint effort of all researchers who have historically taken significant roles in crane banding and resighting, together with personnel responsible for database management, to carry out a first thorough, scientifically rigorous analysis of the results from current ringing data, and report them to the scientific community, conservation authorities, volunteer observers, and the general public, in order to justify international cooperation and funds invested, respond to information demands of society, and contribute to a better conservation and management of Common Cranes in Europe.

KEYWORDS:

Banding, colour ringing, Common Crane, conservation, life history, migration

A hard way to get the new marking system approved

The need to implement colour banding of Common Cranes (*Grus grus*) was first proposed by Spanish researchers, and supported by Swedish colleagues, at the 3rd International Crane Workshop in India, 1983. Among several management needs for the species, they suggested that "banding programs at staging and wintering areas should be carried out to determine mortality rates and the age structure of the population (...). In addition, banding would help define the various migratory units in the Western Palaearctic." (Alonso et al. 1987). Up to that time, only a few cranes had been banded with metal rings in Europe, but obviously a new marking method was necessary to study crane migration and behaviour.

During that workshop, the European Crane Working Group (ECWG) was officially constituted, and two years later, during the First Meeting of the ECWG held in 1985 in Orosháza, Hungary, Alonso & Alonso

(1987) again proposed that "some (colour) banding would be desirable, in order to test the hypothesis proposed in this study, as well as to obtain information on mortality rates, which are fundamental to establish a definitive demographic model of the population." They officially suggested the three-colour-rings as the best marking system. However, the coordinator of the ECWG at that time raised opposition against that proposal, and the long alphanumeric bands were approved as the official system for cranes (van der Ven 1987). In addition, crane banding outside the breeding areas was not recommended by this coordinator, under the argument that birds marked at the wintering areas would probably not be reported again (van der Ven 1987).

Based on these recommendations, between 1985 and 1988 ca. 200 young cranes were ringed with alphanumeric rings in the USSR, Sweden, Finland, East Germany, Latvia and France, but reading the alphanumeric codes of these rings proved to be very difficult. Thus, J.A. and J.C. Alonso again insisted in

their proposal at the Palaearctic Crane Workshop, held in September 1989 in Tallinn, Estonia, where the three-colour-ring system was finally accepted, and its use officially recommended for the future (van der Ven 1990, 1995).

Some months later a formal proposal on the reasons for adopting this new system, ring combinations to be used, and other details was distributed to all members of the ECWG (Alonso & Alonso 1990). Although some ringers continued using the red alphanumeric bands until 1995 (at least 63 young cranes were banded with these rings in Sweden and Finland), most members of the ECWG agreed with the new system, and 16 representatives from 9 countries ratified the approval of this new crane banding system at the International Crane Conference held in January 1994 in Orellana, Spain (Alonso & Alonso 1995).

A good start: the first Common Cranes marked with the new codes

Simultaneously, we started the first marking campaign with this new system in Europe. In March 1988 we captured the first crane in Gallocanta, a juvenile banded with code Red-Black-Yellow, which was seen one year later in Sweden, and reported to us by Per O. Swanberg. We made the PVC rings ourselves, using Gravoply, after receiving advice on the quality of various materials from Stephen Nesbitt, who transmitted us the experience about crane colour banding in North America. Between 1988 and 1992 we captured 117 cranes at Gallocanta, and marked 109 of them (67 ads, 42 juvs) with combinations of three colour rings (Alonso et al. 1995, Alonso & Alonso 1999, Alonso & Alonso, unpublished).

The methods used to capture cranes were oral tranquilizers (alpha-chloralose) and rocket nets. Sixty-nine of these cranes were provided with radio-transmitters, mounted either on legbands or as backpacks. During the following years we carried out a research on several aspects of the behaviour of this species based on radio-tracking, with the collaboration of the Spanish Air Forces, who kindly offered their aircraft to locate marked birds when they had left Gallocanta and had arrived at wintering areas in southwestern Spain (see e.g., Alonso et al. 1995, 1997, 2004, Bautista et al. 1995, 1998).

In 1995, the German Working Group invited the Spanish team to introduce the new marking system, as well as their radio-tagging techniques, during a chick-marking campaign in Germany. Since then, similar campaigns to establish the new three-colour codes and show best capture and marking methods were carried out in several European and Asian countries (Israel, Estonia, Poland, Sweden, Norway, Latvia, Lithuania, Czech Republic, Turkey, Georgia).

The first database of colour-banded cranes

After the conference held in Orellana in 1994, the instructions on how to proceed with colour ringing in the following years were distributed to all members of the ECWG (details in Alonso & Alonso 1999, 1995).

It was also decided that the Spanish Working Group would coordinate the database in Europe, providing the rings to Germany, Poland, France, Portugal and Spain, and send a report on the preliminary results of this database to all members of the ECWG. The Finnish Working Group would provide rings to Sweden, Norway and Finland.

Therefore, a first database with all colour-ringed cranes in Europe was compiled by J.A. and J.C. Alonso and sent to all members of the ECWG (see details in Alonso & Alonso 1999). Also, a first website to report sightings of marked cranes was launched by the Spanish Working Group (www.ecwg.org), providing information about crane breeding, staging and wintering areas in Europe, instructions on how to use colour codes to ring cranes and how to report observations, and data about crane research activities from different groups, crane literature and pictures, news, and links to related websites. The website was closed when the iCORA website was opened (see next section).

In 1995, 87% of the 109 cranes marked in Spain in 1988-92 had been seen at least once, with an average of 2.6 contacts per marked crane (Alonso & Alonso 1999). And in year 2000, only one decade after being marked, these cranes had been contacted ca. 500 times over Europe and Morocco (Fig. 1). In addition to data on migration routes (including some cases of shift between western and central European routes, Fig. 1), these first colour-banded cranes also gave data about age of pairing (four years in five cases), age of first successful breeding (seven years in one case), breeding success (three out of five consecutive years in one case, four out of five in one case, two out of three in one case), mate and breeding and wintering site fidelity, including winter territoriality (several cases; Alonso et al. 2004). Further details are available in Alonso & Alonso (1999). These data clearly showed that the three-colour banding system was effective, and had laid the foundations for a remarkable development of Common Crane banding in the following years in Europe.

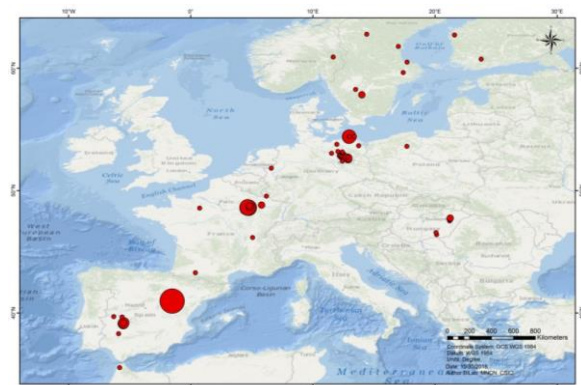


Figure 1. Map showing the first 498 contacts (years 1988-2000) of the 109 cranes colour-banded in Spain between 1988 and 1992. The size of the dots is proportional to the numbers of contacts in each site. A crane using the same site during several days or months was considered a single contact.

iCORA, a step towards a unified Eurasian crane ringing data archive

Crane banding was coordinated by the Spanish Working Group during twenty years (1989-2008). In 2009 the German WG launched the iCORA website (iCORA 2009), where registered users can report their observations of marked cranes and get their contact histories from the website managers. This website includes a section about news and gallery, and instructions on how to report an observation of a ringed crane, together with statistics on number of reports per year, country, or observer, and ringed cranes per country. Similar information and statistics are given each year for Germany in a magazine of the German WG (e.g., Nowald et al. 2016).

At present iCORA contains 140,000 re-sightings of more than 3,800 cranes ringed in seven European countries. However, several countries still do not send their ringing data to iCORA. An estimate of these cranes not yet included in this database, plus those that died before iCORA was launched, would perhaps reach much higher numbers, perhaps close to 200,000 contacts of > 6,500 cranes marked in all Europe and Asia during the last three decades.

If a few hundred contacts of just 109 marked cranes already gave very interesting results in only one decade (see previous section and Fig. 1), we can expect a huge amount of information from these 200,000 contacts, regarding spatial and behavioural ecology, and migration strategies, such as (1) between-year fidelity to breeding and wintering sites, (2) latitudinal shifts in relation to global change, (3) change of migratory route (east-west), (4) age of pairing, (5) mate fidelity; and also about population dynamics, for example (6) changes in breeding success between years, (7) age of first and last successful breeding, (8) lifetime reproductive success, (9) generation time, (10) mean and maximum longevity, (11) mortality, (12) population growth rate, and (13) population structure. Like most other crane species, Common Cranes are an excellent model species to study the effects of global change, since they perform long-distance migrations, need open water to roost, and share agricultural resources with humans.

What is next?

The massive data accumulated in iCORA, complemented with data not yet included in that database, have a great potential for a preliminary analysis of demographic and life-history parameters of the Common Crane. Such first analysis should be done and made public without further delay. As an example, a paper presented at this conference shows the kind of results that can be worked out from an international ringing databank like EURING, using less data than those accumulated in iCORA (Bautista & Alonso 2018).

Today, much information on banding statistics, re-sightings, migration routes, and other data on Common Cranes is scattered across a number of

websites (e.g., <https://amigosdegallocanta.com/seguimientodegrulasmarcadas/>, <http://birdmap.5dvision.ee/> EN, www.satelliittikurjet.fi/, www.grusextremadura.org/), stored in national ringing centers, or still undisclosed in private documents.

It does not make sense to continue splitting up efforts or hiding information to the crane observers' community.

Studying long-distance migration of species crossing national borders is by definition a subject for cooperative research, where all participants have a right to be compensated for their individual contribution. Marked cranes do not belong to a particular country or working group, they are our common heritage, and as such we should share all knowledge about their biology, with the least possible restrictions.

The iCORA database currently stores most ringing data, but restricts public dissemination, and explicitly prohibits using these data for publications. For example, while administrators of the database have access to all data, the life history of a marked crane is sent only to the observer contributing with a re-sighting. These restrictions are surely hindering a wider agreement of all parties involved in crane banding and re-sighting. Through such an agreement of all members of the European Crane Working Group, all data from colour-banded cranes could be centralized in a database that should allow an easier and more open access to a much wider audience, or at least provide periodical reports on the most interesting results.

We are now in a position to supply very interesting data on the life history, demography and migration of our study species. iCORA has a great potential that is currently not exploited. In the era of open access and citizen science we should add, rather than split our efforts, in order to get the maximum benefit of what was born and developed for decades as a cooperative project. Moreover, people and institutions providing private and public funding to finance crane banding campaigns, have an unquestionable right to demand our joint effort to make the results of our work available to society. We only have to agree on the rules to treat the information stored in the databases, define the timings and milestones of the process of data treatment and analysis, and nominate those persons who have the right and will to co-author these documents reporting the database results to the crane observers' and scientific communities, as well as to the general public.

CONCLUSIONS

Since the 3-colour-ring system was proposed in 1985, ringers and observers have invested a huge effort in marking and tracking cranes.

The system is working fairly well, with much of the information centralized today in iCORA (more than 3,800 cranes with over 140,000 reported contacts).

However, the information is still dispersed. If all Eurasian countries send their data to iCORA, with the commitment to regulate the use of this information, total numbers would perhaps be close to 7,000 marked cranes and 200,000 contacts.

The potential information from this database, and the benefits to conservation are enormous. In the era of open access and citizen science we should stop hiding this knowledge to researchers, conservation agencies, and general public.

Our proposal is to complete the colour-ringing database and produce a first report on life-history, demography and migration of the Common Crane based on the ringing results. This report should be co-authored by all crane ringers, together with observers of a significant number of marked birds, and other people involved in data analysis.

Such report will have an immediate value for the conservation of the species and its habitat, promote further research, and arouse the interest of the general public, satisfying everyone's curiosity about one of the most emblematic birds of our fauna.

Colour-banding of Common Cranes was conceived as a cooperative project of all European countries, and as such should continue to reach its final objective, which is no other than increasing our knowledge of cranes, and disseminate it at all levels of society.

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