Przemysław Busse, Włodzimierz Meissner

Bird Ringing Station Manual

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Motto: "In God we trust... everyone else must bring data" - from Evan Cooch's mail

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Preface

Everybody interested in birds – an ornithologist, a recreational birder, and even bird afficionados know about bird ringing, or banding. For most, ringing is only a fragment of their general education. However, a subset of people who learned about ringing were so excited with the method, and how it could be used to solve the bird migration problem, that it became the core of their professional life. This was the case of the authors of this manual. The older one of us – Przemysław Busse – ringed his first five chicks in a swallow nest as a 16 year-old boy in 1953. The subsequent year, he was accepted as a ringer, and in 1955, he started to ring chicks of Black-headed Gull, White Stork and swallows as a member of the Polish Ringing Centre expeditions to Masurian Lakes district. Ringing of full-grown birds was a great discovery during a visit, with Bob Spencer as a host, at the Bradwell Bird Observatory in Great Britain in 1959. The result was surprising. In 1960, the first Polish bird station tried pioneering ringing of full-grown birds during autumn migration, and a group of students from the University of Warsaw started to learn bird migration at the Polish Baltic coast. Our minds were fresh, for we knew nothing about bird migration, but we were enthusiastic. Since bird migration is a vast and very complicated phenomenon, the main idea became to create "*a NETWORK working according to the standard methods*". We dreamt about long-term study programme, which later manifested into "Operation Baltic", which is still the longest-running bird migration research network. The saying *"Never laugh at anyone's dreams. People who don't have dreams don't have much*" was confirmed, and we have the long-term programme to prove it. Among the Polish ornithologists gaining interest in birds during the 1960s and 70s, there was not a single person who did not pass through the Operation Baltic experience. The second of listed authors is not the exception. Although his time with the Operation Baltic work was short (only few days), he worked at the station in southern Poland that organized the ringing of waders. This was enough to establish the ringing station at mouth of the Reda river devoted to wader study in 1983, and it followed suit in the maintenance of long-term studies. The group was called KULING, and it is still actively attracting new generations of ornithologists.

During many years of intensive work at Operation Baltic and KULING, many methods and ideas from the field study of migrating birds were tested. We gained a great deal of experience. Political borders were broken, and the saying that "*birds do not know boundaries*" could be followed by students of bird migration – that is truly a phenomenon on the continental scale. While visiting many bird stations, from Spain and Britain to Russia and from Finland and Sweden to the Middle East and even Tanzania and South Africa, we found that the main problem of international co-operation is the incompatibility of methods and the local routines of work, and these make exchange and efficient use of data files very difficult. And once more the idea of "*a NETWORK working according to the standard methods*" appeared to be a proper solution. In 1996, an international network was arranged on the East

European flyway – the SEEN (SE European Bird Migration Network). This gave us the opportunity to collect broader experiences and confront new exciting problems to study. The manual is intended to collect and present to wider audience more than 50 years of practice in the field work of ringing of birds, mainly during migration.

We are deeply grateful to all, for there are numerous people who contributed to this manual and discussed its contents. Especially, we would like to thank to Dr. Vladimir Payevsky, Russia and Dr. Ricardas Patapavicius, Lithuania for supplying us with details about working with big Heligoland traps that were less known to us.

We hope that the manual will be useful, not only for bird stations, but for many ringers who ring birds not only for fun, but for whom the ambition is to contribute to science as well. Obviously, not all parts of the manual will be applicable in an individual ringing, but it is always worth it to contemplate anew upon the encounter of novel, sometimes apparently strange ideas – especially when we plan to start a new project.

Przemysław Busse, Włodzimierz Meissner

Figure P1: Three generations of Operation Baltic – KULING – SEEN ringers: Przemysław Busse, Włodzimierz Meissner and Magdalena Remisiewicz.

50 Years of OPERATION BALTIC

Figure P2: Logo of Operation Baltic (by J. Desselberger and P. Busse).

The Operation Baltic is a scientific programme with the aim of long-term, complex bird migration study along with monitoring numbers of migrating birds. The programme has been running continuously since 1961 and covers both autumn and spring migrations.

The fieldwork of the programme is carried out at few (2-6) seasonal bird stations situated along the Polish Baltic coast.

The routine work consists of:

1. Mist-netting of birds with stable number of nets, working continuously during migration periods (March 24th - May 15th and August 14th - November 2nd). Standardised catching allows evaluation of long-term number trends in the bird populations passing the stations;

2. Ringing and measuring of all individuals caught. The standard set of measurements contains: wing-length, tail-length, quantitative wing-formula, weight, and fatness. This is the basis for migration and biometric studies;

3. Visual observations of diurnal passage; bird species, numbers and direction of flight are observed all day, fifteen minutes per hour; this gives an information about the dynamics of migration as well as long-term trends in species not caught by the nets;

4. Extensive testing of nocturnal migrants for directional preferences using new orientation cage desing which is one of the most important points of the fieldwork now;

5. Volunteers. University students and amateur birdwatchers, who help the professional staff of the stations, do most of the fieldwork. The collaboration with amateurs allows around 50 young people to be trained in bird identification every year, along with increasing exposure to scientific work and raising awareness about the bird protection. Participation of volunteers makes the cost of programme work relatively affordable.

During Operation Baltic, over 1 600 000 birds were ringed and over 1 000 000 of them fully measured. For few small passerines, e.g. Goldcrests, collected data exceeded European totals. A dozen or so thousand ringing recoveries cover Europe, from Portugal to the Ural Mountains and from Finland to Greece, as well as few in Middle East and African countries. It can help to look for areas that are critical for bird survival. This is very important when monitoring data are evaluated.

The Operation Baltic monitoring data represent one of the longest passerine monitoring series in the world. They are also the most extensive, as they contain information from few stations working according to the same methodical standard, and they cover a much wider variety of species (parallel bird netting and visual observations) compared to stations limited to bird catching only. No single passerine bird species is excluded from the field of interest of the programme, so the Operation Baltic data contain information about a number of rare, even endangered, species of birds.

The value of monitoring data grows exponentially with prolongation of the data series. Evaluation of long-term population cycles is possible only when periods of monitoring work exceed the length of the cycle. The level of short-term fluctuations around the long-term trends can be studied successfully only on long data series.

30 Years of WATERBIRD RESEARCH GROUP KULING

Figure P3: Logo of Waterbird Research Group KULING (by M. Skakuj).

The story of KULING has its roots since July 1981. During this season, two students from University of Gdańsk had seen walk-in traps for the first time in their lives and took part in wader ringing. After a couple of days spent at a wader ringing camp in southern Poland, they returned to the Baltic coast with the idea of organizing wader

ringing camp in the Reda river mouth. The Waterbird Research Group KULING was established in 1983 by a group of so-called KULING fathers (Włodzimierz Meissner, Bogdan Brewka, Michał Skakuj and Arkadiusz Sikora), as an informal part of the students' scientific circle dealing with autumn migration of waterbirds and waders in the Gulf of Gdańsk.

Since the very beginning, KULING had a marvellous atmosphere that led students, pupils, as well as amateurs and professional ornithologists to work together in the field and share ideas during social meetings. KULING's field activities became focused on two main topics: studies on wader migration and monitoring number of waterbirds during the non-breeding season in the western part of the Gulf of Gdańsk. In 1996, WRG KULING was registered as a non-governmental organization, even though it is closely connected with University of Gdańsk.

Between 1983 and 2012 KULING team ringed more than 70 000 waders, about 8 000 wagtails and pipits, and more than 8 000 gulls. The vast majority of birds were ringed at temporary working ringing stations. The overall number of birds ringed by KULING reached 100 000, and this gives to us the opinion that it is one of the most effective ringing teams in Poland.

The archive of publications signed as "paper of WRG KULING" consists of 150 scientific papers, and the majority of them concerns wader migration. Notably, we are also involved in educational activities in the Polish coast.

We decided to call our group KULING after the name used by the native people of the Puck Bay area for large waders. They recognize only two kinds of waders: small ones (up to Knot, *Calidris canutus*, size) that they call "bigus", and large ones that they call "kuling". It sounds very similar to "kulik" – the Polish name of the Eurasian Curlew, *Numenius arquata*. "Kuling" seemed to us a better name than "bigus", and we adopted it as the name of the group.

15 Years of SE EUROPEAN BIRD MIGRATION NETWORK

Figure P4: Logo of SEEN (by T. Cofta and P. Busse).

Bird migration is a phenomenon on a continental scale, greatly differentiated in various regions, and it has many complicated features. There are some main flyways

within continental migration systems that are studied more or less in detail. Bird populations of the same species, but originated from different areas, can migrate *via* various flyways and to different winter quarters. So, it is not enough to study the phenomenon at a single bird station, at one limited area, nor along a single flyway. The "network style of work" is absolutely necessary. Some attempts to network at an international scale were run by Operation Baltic, which attracted a few ornithologists from the late Soviet empire to collaborate. It was a very limited collaboration. Next, trials were made within "ESF European-African Songbird Migration Network", working for three years on the SW bird migration flyway in the mid-1990s, and finally *Manual of Field Methods* was published. In 1996, a group of ornithologists from northern and central Europe established SEEN ("SE European Bird Migration Network") that focused on the SE flyway that had been poorly studied as of yet. Necessity for a common methodical program led to the preparation of a comprehensive manual, published in 2000, which gave not only methods of the fieldwork, but also methods of evaluating the collected material.

SEEN is an international umbrella organization of institutions studying bird migration along the South Eastern migration route that leads from Europe and western Asia to Africa. Our objectives are to encourage research and enhance understanding of migratory flyways, to establish a uniform methodology of bird migration data collection, to elaborate and develop new techniques of data analysis (including computer software, highly specialized statistical methods etc.), to assist in international co-operation and the exchange of information and experience relating to bird migration, and finally, to promote the conservation of birds and their habitats. Our network offers support in organizing bird migration research, regularly conducting training in the methodology of bird migration studies, particularly in countries where, until now, such studies were either not conducted at all or conducted on a very irregular basis. Participation in SEEN is non-exclusive. Ornithological research stations, departments and laboratories of colleges, universities and other schools of higher learning, scientific and nature protection organizations, non-governmental organizations and study groups working in the field of bird migration research can become members of SEEN.

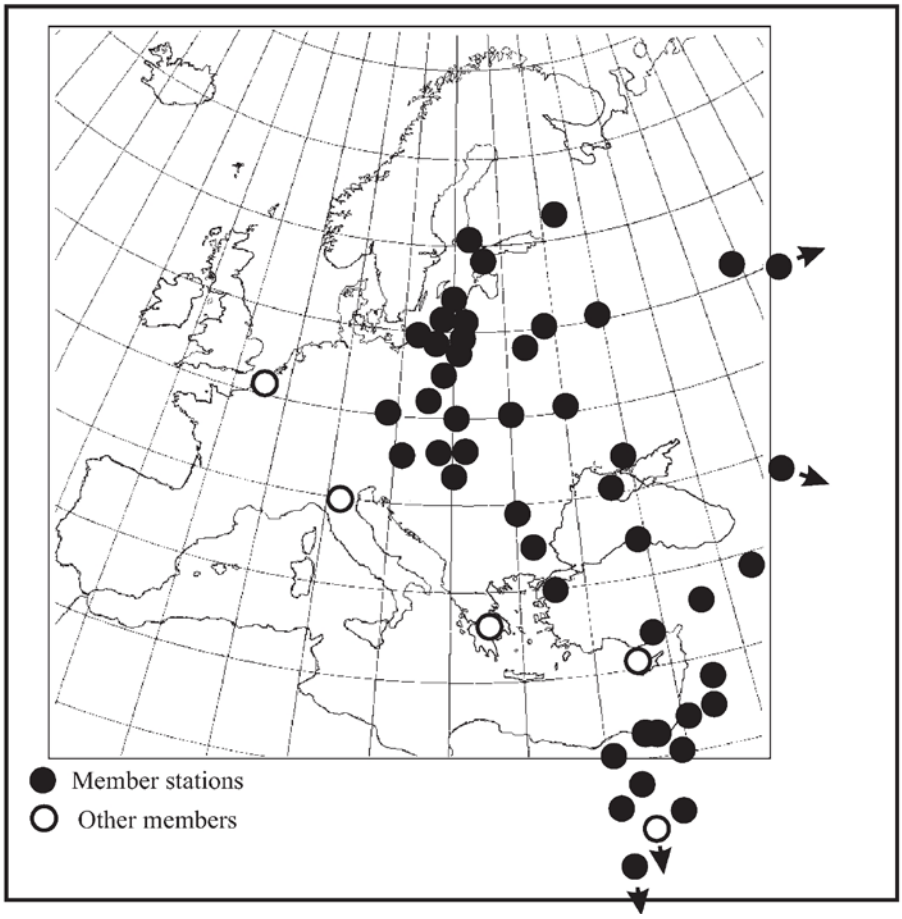

Figure P5: The map of the SEEN sites.

Introduction

Collaboration between bird ringing stations of a research network requires both standardization and flexibility. The aim must be to standardize elements of the station routine, where results will be directly compared during further evaluation of data. This includes: techniques for measurements, orientation experiments, or monitoring. On the other hand, flexibility should allow collection of standard data as well as different specific studies performed within our own projects and local agreements with various partners. One of the most important tasks to setting up the station routine is organizing the work in such a manner that an optimum output of results will be obtained with a minimum effort. Optimum results mean not only a maximum number of birds caught, but also the collection of useful, scientific data with the sources at hand. Depending on local conditions, catching devices, and the size of station staff, and optimisation of a station routine may need more or less attention. At any rate, it will make the work easier, more effective and satisfying. So, let us try to establish the station routine in a way that is favourable to both birds and ringers! All people catching and ringing birds use some of these working methods, while others turn out to be more habitat- or bird-group specific. In this book, methods will be presented for catching passerines with mist-nets on land and in wetland habitats. Furthermore, this manual will explain how to work with Heligoland traps, and, finally, how to catch waders and, to a limited extent, raptors/owls with nets and traps. At times, the methods described will be applicable to catching birds from other groups, but these possibilities are taken into consideration here. According to the main focus of a ringing station, two main types may be discerned: “passerine” and “wader” stations. Most of the chapters will contain information common to both types.

PART I: **The Passerine Station**

1 Methods of the Field Work

1.1 Catching

The point of departure for the standard of all bird ringing station work is the agreed-upon number and the quality of catching devices. In most cases, mist-nets are used, and their number and construction determine how to stabilize the catching effort both on a seasonal as well as a long-term scale. If a Heligoland trap is in use, the only standardization problem is the operation time of the trap, which will be influenced by wind force. In modern migration research, the dynamics of seasonal bird migration is the basis for the interpretation of other data. Therefore, stable operating time of Heligoland traps or a standardized number of nets used during the season are an essential methodical requirement. The number of nets in use must be fixed to a level at which the number of available staff can safely handle all birds caught. The main aims of bird ringing station work are: monitoring of bird numbers and seasonal migration dynamics and collecting data for biometrical and other studies of special objectives. Rarely, the work at the ringing station is dedicated only to ring maximum possible numbers of birds.

According to the aims of work at a station, the catching methods must fulfil some requirements (Table 1.1).

Table 1.1: Constrains for different kinds of studies.

Aim of the study	Number of nets
1. Monitoring	stable within a season, stable between years
2. Seasonal dynamics	stable within a season
3. Biometrics	recommended stable within a season
4. Special studies	recommended stable within a season
5. Ringing only	allowed variable number*

* but see p. 4 (point 5)

These requirements can be listed more in detail:

1. Collecting of monitoring data

In this case, the highest level of standardisation is necessary.

1.1. The work must be planned for a sequence of years.

1.2. Time and period of work is standardized. Within the season, work should be carried out continuously, or at least be made as regular and frequent sampling (this compromise, however, is not recommended!). This is because the migration intensity is very irregular – after a day with no birds, one can have a rush of hundreds or thousands and more birds caught. In the Operation Baltic practice, we had even

days when around 20% of yearly catches of one species occurred. Missing such days when sampling could drastically change the total value for the season.

1.3. Equal numbers and quality of nets should be used from year to year, and when new nets are added to standard set, birds caught in the added nets should be treated separately. It must be stressed, however, that any changes affect comparability.

1.3.1. The number of nets should be stable within a season (minor changes may be compensated for when data are evaluated). The nets damaged or stolen should be replaced as soon as possible; good hint: have a stock of a few nets at hand as a backup for replacement.

1.3.2. The daily netting routine should be stable. It is advised to catch birds continuously without closing the nets for night time – in many places, catching peaks do not occur regularly at the same time of the day; e.g. thrushes that have landed after a sea-crossing start to be active in the middle of the day, instead of early in the morning as usual. If possible, do not close nets during migration peaks (unless survival of birds caught is endangered – but also see *Laboratory Working Routine* hints – p. 118). At some sites, because of special constraints (e.g. high temperatures and insolation in lower latitudes, known and very stable daily catching pattern, and living conditions of the staff), nets may be closed for part of the day. It is advisable to do this regularly at the same time by not prolonging catching because e.g. "there are a lot of birds today", or in order to finish work earlier as it seems a "poor day"). Within Middle East and Northern Africa, a good time for a siesta is between 11.00 and 15.00-16.00.

1.4. Changes of environment must be taken into consideration. Three ways of minimizing the influence from such changes can be listed – (1) arranging the catching area within a relatively stable environment (such habitats are, however, usually not very rich in bird species), (2) controlling growth of trees and bushes (note, however, that the surrounding area will be changing all the time), (3) actively shifting the catching plot within a bigger area of similar environmental conditions (value to birds!). A combination of these methods could be applied according to knowledge of local conditions.

1.5. The nets should be located in different habitats and the distribution of nets relative to habitats ought to be stable over the years.

2. Seasonal dynamics of migration

This is one of the most important types of data in any context.
The contents of points 1.2 - 1.3 (above) should be attended to, but any sampling error may affect the picture of seasonal dynamics very much. It is important to remember that during one missing day up to 20 percent of the annual catch of one species could be missed!

3. Bird measurements

Catch as many birds as you are able to measure, but note: bird measurements without the possibility to localise these measured birds within their migration waves have very

limited value! Therefore, adjust number of permanently opened nets to the expected high level of catching (but not to single peaks).

4. Orientation tests, blood sampling, parasite sampling etc.
Catch as many birds as you are able to handle with these techniques, but recall previous note under point 3.

5. Ringing only
Catch as many birds as you are able to ring (including sex/age determination!). Erect as many nets as you are able to handle without bird losses; eventually use tape-luring, however remember – and once more remember – that station work is not a ringing championship, but means the collecting of scientific data. Today, ringing of migrants is closely connected with collection of other types of data. Seasonal dynamics must be known when ringing recoveries are evaluated in the modern way. Reduce your order for nets, unless they are planned for storage a reserve for replacements, and try to fulfil requirements stated under point 2.

1.2 Visual Observations

Visual observations are frequently performed at ringing stations. They are focused on different groups of species according to the main field of interest of the station staff. Bird counts may be performed in two different ways – (1) counting birds in active migration flights and (2) counting those resting in surroundings of the station area. The first method is used mainly at the "passerine" stations, where both passerines and other diurnal migrants are counted there, as well. The second method is used at "wader" stations, however it is not possible to follow all wader migration as they migrate mostly by night – for more details see *Wader Counts* - p. 160). In many localities situated at guiding lines like sea coast, spits, and rivers, the stream of diurnal migrants follows a well-defined course, and this may fluctuate within very narrow limits. At other sites, diurnal migration will show "broad-front" character and migrating birds will be dispersed over the whole area. In the first case, the migration count will be more effective, as birds are observed even if actual migration is not intensive. On the other hand, the count could be difficult during a mass passage when there are tens of thousands of migrants per day. Out of concentrated streams of migration, visual observations could be boring, as a low number of migrants are observed, but even in such cases, one could collect interesting data. Areas with no clear guidelines may give biased results due to local changes in the concentration of flying birds, e.g. when parts of flocks may stay outside observers' sight.

Visual observation of the passage should be made from a fixed stand located at the local stream of migration, if there is one within the station area. In order to get good estimation of the total number of birds passing the observation point, all

day observations should be applied, especially in localities where the intensity of the passage notably varies during the course of a day – this frequently occurs at the sea coast, where some birds have crossed the sea prior to reaching the local stream of migration. Usually, when birds migrate over land, the passage is limited to a few hours after sunrise. In some coastal areas, peaks of diurnal passage occur around noon or even in the afternoon. It is true, however, that observations made during out of the peak of passage are tiresome and boring to the observer, unless they are given a chance to rest. Because of this the observation time during lack of passage can be shortened.

There are two methodical variants of the migration counts used:

1. Continuous observations from sunrise to sunset, or at least for 6-8 hours. Observations are performed on a **daily scale** throughout the migration period, which is a difficult task, but the result will be the real number of birds passing by an observation point,
2. Sampling observations done on a **daily scale** and within a day where a sampling procedure is applied (usually 15 minutes per hour) – this method allows estimates of real numbers of birds passing and is not equally exhausting to the observer. Moreover, it does not disturb ringing at the station, because counts are conducted at the time of mist-net checking. The correlation of the results with the first method is at the level 0.90 (after own comparisons of these two methods in early years of the Operation Baltic studies), which can be accepted as very good.

It is critical to stress that, as in catching, any sampling not based on daily counts is biased by the continuously changing migration dynamics of every species, including both diurnal and nocturnal migrants.

The recommended observation routine (Fig. 1.1):

1. The observations of the passage are carried out at 15 min per hour sampling, starting at full hours, and beginning around sunrise and continued till sunset. When there is no observable migration in two consecutive 15 min observations, the next observation is shortened to 5 min; return to the normal routine must be applied consistently when the observer notices intensification of the passage of at least one species. If it is evident after a few years of observation, that the particular locality has no noon and afternoon movements, visual observations might be limited to highly effective times only.
2. At places where intensive bird migration occurs, birds are identified, by sight and sound, and counted within a flexible range – for small birds the range should allow for the identification and count by means of the naked eye, without use of binoculars (when many birds pass, there is no time to check all birds with binoculars); in larger birds (e.g. when raptors are included), the range is limited to a sector within which it is possible to see the bird with the naked eye, but