Collaboration of bird stations as a stimulus of methodological progress*

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Co-operation between bird stations is nowadays very common: only six stations among fiftynine which responded to a EURING inquiry declared that they do not collaborate with other stations. There have been published several papers based on data collected from different stations (sometimes from as many as twentythree—e.g. Hildén 1977). This means that the basis for bird migration studies has reached a quantitatively new level. However, one could ask if the multitude of data is accompanied by an equal development of evaluation methods. It seems that methodological progress is not so pronounced at the moment, although the increased amount of data should increase the possibilities to elaborate new methods. The main reason for this situation lies, I think, in psychological inertia. Through many years the aim of students was limited to the analysis of material from one place only and for this reason, in many cases, data from other stations are still used only as a background to one's own material. It is a reflection of the "one-point thinking". Changing this way of thinking to a more complex one is not always easy, but very promising, especially in the field of methodology. This is easiest for students working on data collected by an organized network of stations, using standardized or easily comparable methods, and with the material presented in a standardized form.

Let us look at some examples of how to widen the elaboration possibilities, by using data from two or more stations:

(1) Migration dynamics studied at one station allows us to describe the phenology of migration, divide migrants into migration waves and eventually homologize waves through the years. The same data, but from more than one station, can be the basis for hypotheses on the populational differentiation of migrants (e.g. Fig. 1; Maksalon 1983, Petryna 1976).

(2) Biometrical studies carried out at one station can only give information about the morphological differences between migrants passing that station in subsequent waves, while a comparison of data from two stations may confirm hypotheses about population differences arrived at by other data from these stations. Having at one's disposal data from several stations makes it possible to start studies on the spatial structure of populations on breeding grounds, by using relations between clines of various biometrical parameters (Fig. 2; Busse 1983). Such studies may then help to localise, the breeding grounds of migrants with certain morphological characteristics.

(3) Studies of population dynamics based on migration counts at a single station give some information about dynamics (Fig. 3), but a poor chance to fix the origin of migrants. This eliminates the possibility to compare the results with breeding

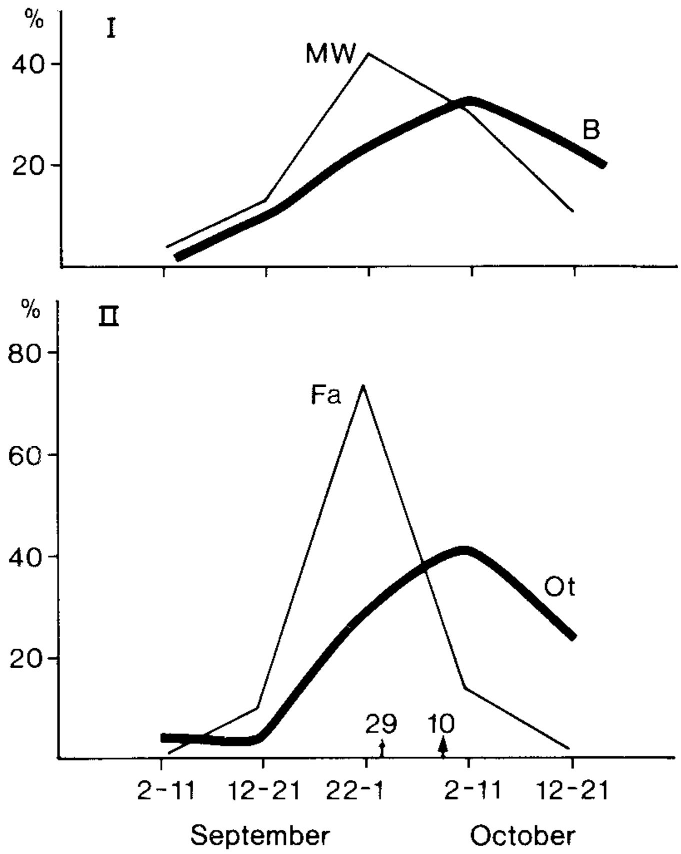

Fig. 1. General migration dynamics of *Turdus philomelos* at some Baltic ornithological stations. I — Operation Baltic stations (trapping figures): MW—Mierzeja Wisla-na, B—Bukowo; II — Swedish stations (visual observations): Fa—Falsterbo, Ot—Ottenby. Mean migration dates for the Swedish stations are given. Simplified from Maksalon 1983.

* Operation Baltic papers. No 58.

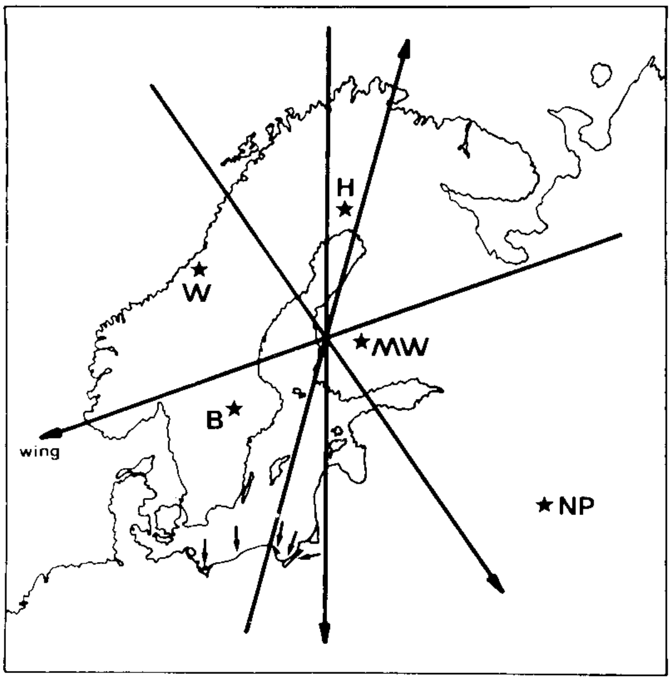

Fig. 2. Hypothetical situation of cline axes for some biometrical parameters of *Turdus philomelos*: wing-length axis (WSW-arrow), tail-length (S), L-index (NNE), weight (SE). The centres of breeding grounds for migrants passing different Polish stations are indicated by stars and the stations themselves by arrows. After Busse (1983).

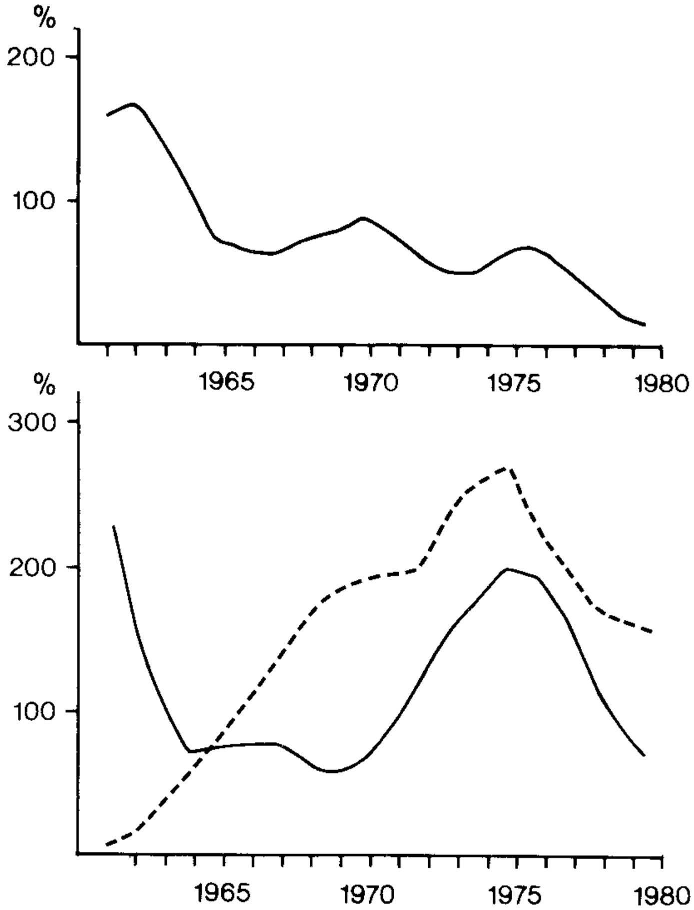

Fig. 3. Population dynamics curves. Upper: *Prunella modularis* (Bukowo), Lower: *Troglodytes troglodytes* (— Bukowo, --- Mierzeja Wislana). After Busse (1984).

bird census data. Use of data from more than one station allows us to combine results and to study similarities or dissimilarities of trends, which gives information about population differentiation of the migrants (e.g. Fig. 3; Busse 1973, 1984). It may also help in the localisation of breeding areas and or winter-quarters (Petryna 1976).

Ringing results are the best examples, at the moment, to demonstrate how new methods have grown out of the elaboration of data from several stations.

(4) One of the most important problems in the evaluation of recoveries coming from different winter areas is whether the numbers of recoveries reported from various parts of these areas mirror the numbers of birds which actually winter there. Solving this problem became possible when recoveries of birds ringed at different stations were studied simultaneously (Busse & Kania 1977). The method can be applied to one-station-data too (when different waves of migrants consist of different populations), but it was born out of the necessity to combine data from some Operation Baltic stations. It allows us to calculate how large a proportion of the birds migrating through one place goes to one specific wintering area (Fig. 4; Busse & Maksalon 1978).

(5) Recovery rates for different species are commonly published in reports from bird ringing stations, in direct or indirect form, but so far they have mostly been treated as purely statistical information about the efficiency of ringing work. Evaluation of recovery rates of *Turdus philomelos* at five Operation Baltic stations and at Rybatchy has shown that unexpected differences occur (Busse & Maksalon 1978). Plotting these values against the geographical position of the station showed an astonishingly low ringing efficiency at Bukowo, on the central part of the Polish Baltic coast (Fig. 5). The hypothesis which then arose was that at Bukowo pass *T. philomelos* going to the Balkan Peninsula, where detectability of ringed birds is very low. The origin of these birds was not known, but further investigations of recovery rates at various Baltic bird stations has solved the problem of their migration route (Fig. 6). Low recovery rates at Store Færder, Hammarö, Falsterbo and Bukowo, in contrast

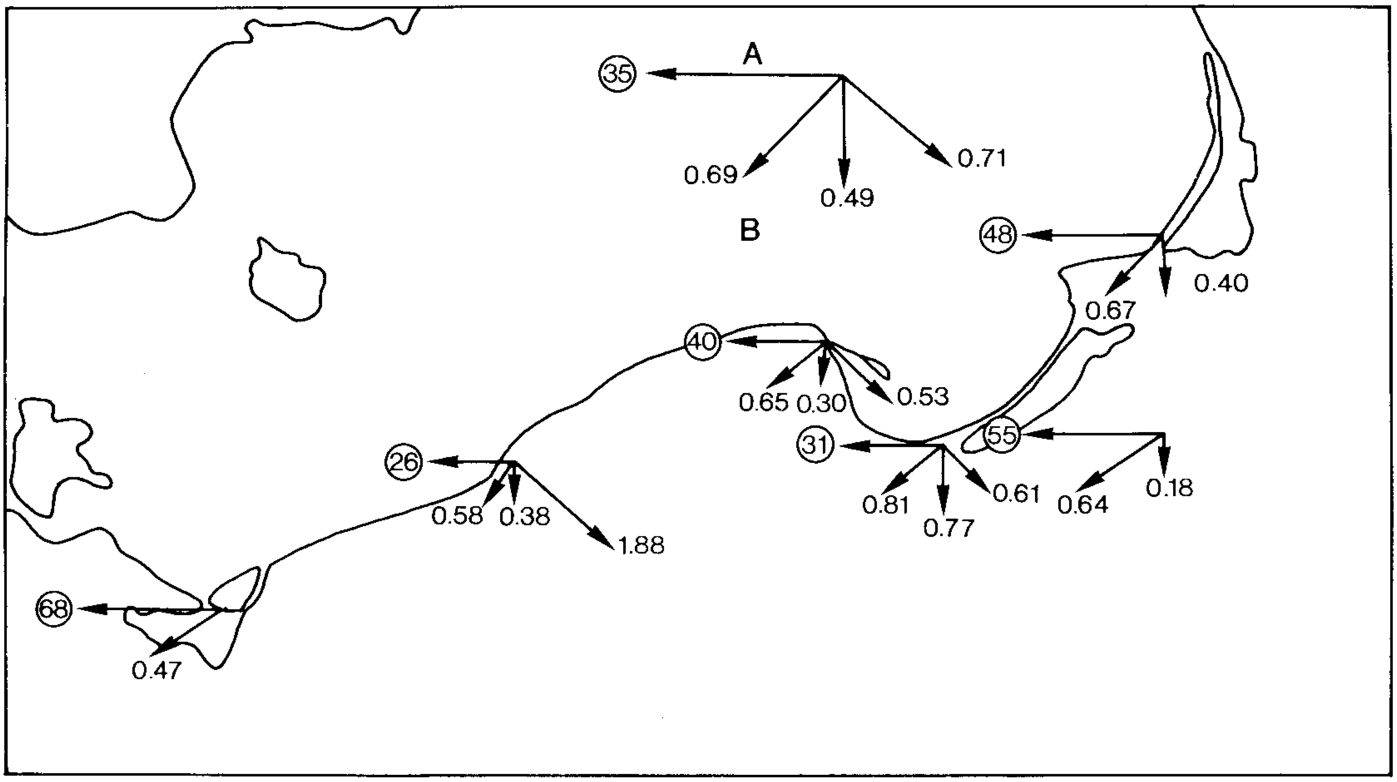

Fig. 4. (A) Frequency distribution of *Turdus philomelos* migrating towards four winterquarters at all south Baltic bird observatories together. (B) The same for separate stations. After Busse & Maksalon (1978).

to other stations, indicate the migration route. Comparison of recovery rates of *T. philomelos* ringed as pulli in Norway, Sweden and Finland then suggests that these birds originate from the north-western and northern Scandinavia.

(6) Direct recoveries of migrants are most numerous when ringing stations lie on the same migration route. They are *ex definitio* the result of collaboration between stations. But more co-operation than the obligatory exchange of ringing recovery data is necessary for the fruitful evaluation of this kind of data. Gathering in one hand all direct-recoveries between stations situated on migration routes allows us to study changes of migration speed at different stages of the migration, and can even show that isolation mechanisms between migrating populations exist (Busse 1978).

(7) Migration dynamics data may make it possible to estimate the number of birds in the migration stream and even the income and outcome budget of them at every stage along the migration route (Busse 1985). An evaluation of the *Parus ater* invasion of 1974, based on ringing figures (35 991 individuals at all stations) and direct recovery numbers (1159 altogether), recalculated to direct recovery coefficients (the number of direct recoveries per one thousand ringed birds at one station and one thousand controlled at the next one). The resulting graphs show how birds successively join the migration stream along the route (Fig. 7).

This last example illustrates some troubles with the application of the method, which must be based on data collected by co-operation. Lack of migration data from the Lithuanian stations Neringa and Ventes-Ragas eliminated over 40 per cent of

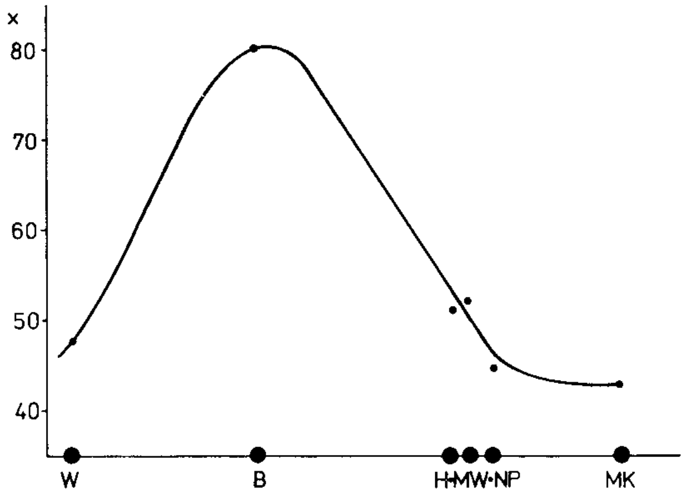

Fig. 5. Recovery rates of *Turdus philomelos* ringed at different south Baltic bird observatories (B—Bukowo, H—Hel, MK—Rybatchy, MW—Mierzeja Wislana, NP—Nowa Pasleka, W—Wapnica). X = ringed birds per recovery. After Busse & Maksalon (1986).

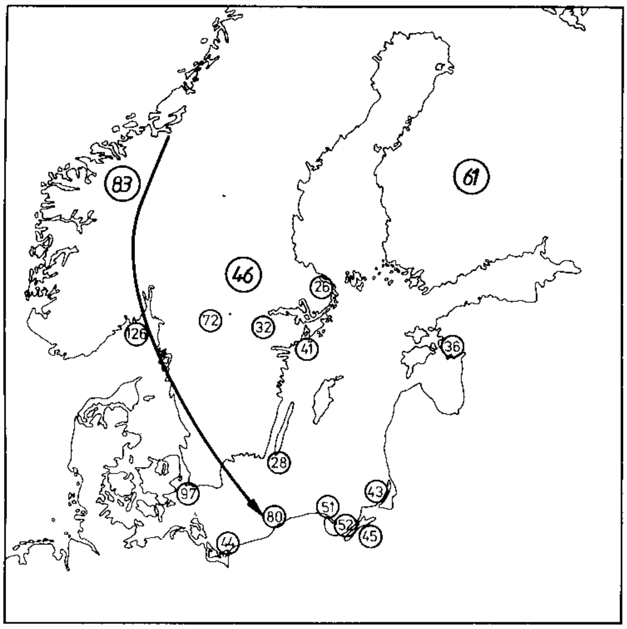

Fig. 6. Ringing-recovery rates (ringed birds per recovery) of *Turdus philomelos* ringed at different places. Small figures show values for migrants ringed at different stations, big figures values for birds ringed as pulli in Norway, Sweden and Finland. After Busse & Maksalon (1986).

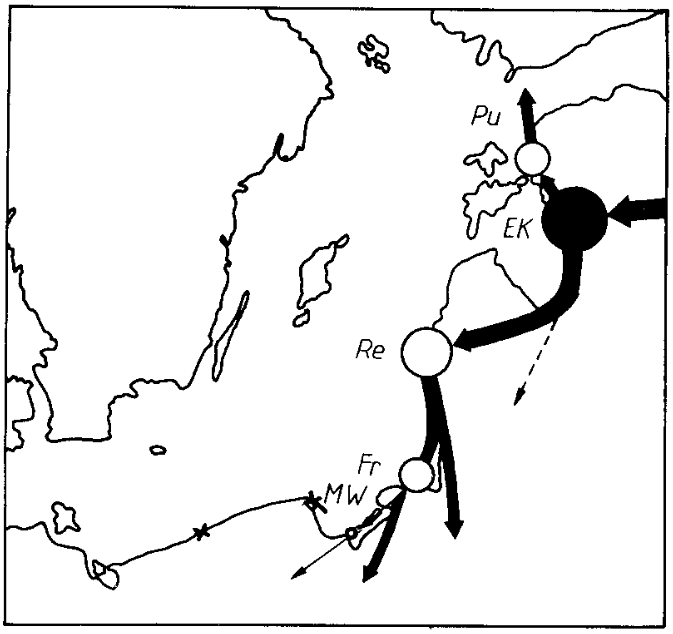

Fig. 7. Migration of *Parus ater* joining the east Baltic stream of migrants at the latitude of Kabli (EK) in Estonia. Thickness of lines represents the number of migrating individuals. The grand total is estimated at 176 000. After Busse (1985).

the recoveries at disposal and caused a serious gap in our knowledge of how many birds migrated from Kabli directly to the south-east coast of Courland Bay. Such regrettable behaviour of station leaders can be found at both east, north and west Baltic observatories. The reasons for this withholding of data probably vary, but the deepest reason, I believe, is psychological—a resentment of the fact that somebody, somewhere, will be able to use the data collected by a station more efficiently than its own people.

Apart from the mentioned psychological reasons for too weak collaboration between stations, there are practical difficulties in exchanging larger material. But these can be overcome by organizational (standardization of work) and technical (computerization of files) means.

We must remember that the further development of bird migration studies is not possible if the exchange of data is stopped by protectionism.

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