The convenial as the reverse look at the dispersal – or: Where do the Barn Owls *Tyto alba* living in the northern German lowlands come from?[1]

by Ernst Kniprath*

1 Introduction

All studies on the movement mostly of the young barn owls analyzed, where to the young fledged somewhere dispersed (reviews: KNIPRATH 2010, KNIPRATH 2012. 2013). The inverse aspect: “How did the owls assemble, which bread somewhere?” could be interesting as well and lead to new insights. Occasionally there is a mostly short paragraph in a paper concerning a certain (sub-)population (DE BRUIN 1995; DE JONG 1995: MÁTICS 2003; KNIPRATH 2007: 23; POPRACH 2010: 220, 231; KNIPRATH & STIER-KNIPRATH 2013). The new term **convenial** used here in analogy to dispersal is derived from the Latin: convenire=come together.

2 Material and methods

From the study of the dispersal (Kniprath 2012, 2013) up to the start of the present study certainly some time has passed. Even if the recovery data clearly have augmented since, the same data base has been used for a better comparability. Thus we here analysed the recoveries made in the area of the “Vogelwarte Helgoland” up to 2008. From these those of the northern German lowland have been selected (n=7.336). The owls belonging to these recoveries had been ringed in the whole of Germany and in the surrounding countries, as far as the data had been transferred from the national schemes to Euring (GEITER pers. comm.).

As the recoveries made by ringers only amounted to 36 % of the total recoveries, no special geographic concentration had to be expected, except of those areas preferably inhabited by barn owls. So the areas selected for the study of the dispersal (KNIPRATH 2012, 2013) here not could be used. Instead the total area of the lowlands had been subdivided into 12 rectangular sub-areas with straight borders of a roughly similar extension. In the “results” they are characterized by their coordinates.

As it seemed interesting whether the convenial of those owls which with some certainty already had settled (starting with April 1 of the year following the youth-year: after KNIPRATH 2013: 38) would be different of that of all owls recovered, both quantities were analysed separately. Likewise the recovery data of the owls ringed as nestlings were analyzed separately from those ringed as adults. In both groups special emphasis was concentrated on multiple recoveries. In the data of the Vogelwarte for each recovery we find the site of ringing but not that of eventual additional recoveries between these two dates. To detect the respective distances of origin of an owl recovered several times indeed for every n+1 control the site of the previous control number n is of importance, the ringing site only for record Nr. 1.

The distances and the directions of origin were calculated as described in the paper on the dispersal (KNIPRATH 2012).

[1] Translation of: Kniprath E 2015: Das Konvenial als umgekehrte Betrachtung des Dispersals – oder: Woher kommen die Schleiereulen *Tyto alba*, die im norddeutschen Tiefland leben?

If the indication of the sex of an owl was differing between ringing and recovery for captures the data of ringing were taken.

Owls recovered manifold and ringed as catches were separated. The nth recovery of these in each case was counted as a new ringing and its n+1st recovery nominated to a new recovery. These new datasets then were added to the original table. This proceeding also was valid for the manifold recoveries of owls formerly ringed as nestlings. As these not had flew from their ringing site to the n+1th recovery site but from the nth one to that place, the directions and distances were newly calculated.

From the part-quantity “ringed as nestling” (n=5.581) those where excluded, which had been recovered at the ringing site (n=341). It is suggested that they had been found dead there sometime later (e.g. at the next control of the breeding site). Among the remnant 5.240 ones there are still those with more than one recovery. Here only the respective first one is relevant. The rest later will be added to the recoveries of owls ringed as catches. The number of items now is 4.556.

3 Results

3.1 Barn owls ringed as nestlings

Of the 4.556 owls 4.510 had been recovered after 1949. Their distribution over the years is given in figure 1. Then we were interested, whether their distances of origin had altered over time. In figure 2 two different things become visible: 1. Till 1985 the scattering of the medians of distances of origin is high, thereafter evidently less. 2. The recovery distances increase until the early 70th, later they distinctly decrease. This decreasing indeed diminishes. Here the only possible explanation seems to be that the former steady loss of breeding sites always more evidently had been moderated by the admittance of nest-boxes. So the settling of the dispersing young owls possible steadily happened nearer to the fledging site. This effect indeed meanwhile diminishes.

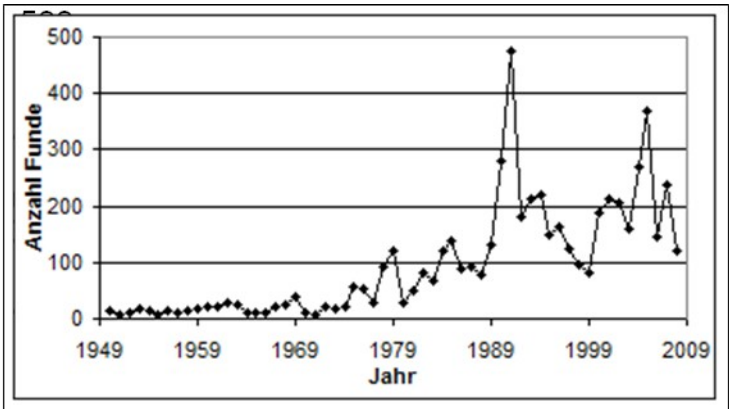

Figure 1: Yearly recovery numbers (resp. first recoveries in multiple recoveries) of barn owls ringed as nestlings (n=4.510) for the years 1950-2010

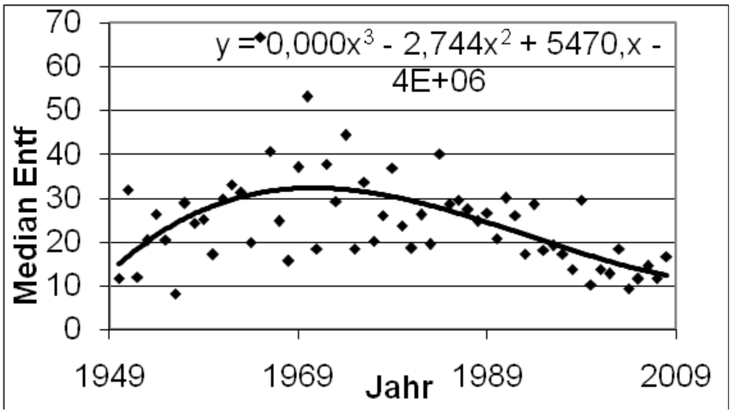

Figure 2: Median (km) of the distances of origin of the owls in figure 1 for the recovery years1950-2010 (n=4.510)

We then tested, whether all young owls recovered off their fledging site should be covered by the study or only those, which with great probability had settled. To discriminate these latter ones the limit had been fixed (KNIPRATH 2013: 38) between the two months of February and March in the year following the fledging of the owls. Thereafter no dispersal of importance takes place.

For both quantities (fig. 3) the proximity of the North-Sea as well as that of the northern distribution limit is recognizable. The comparison of the directions of origin of all owls with that of those with an immigration distance of >100km ("far-distance-movers" 11.11 %; fig. 4) then clearly demonstrates that we indeed see these influences. There seems to be no further preference of any other direction. The slight depression in the direction north to northwest is also found for the distance of origin (fig. 5). There is no sign of a special – or even a mostly lacking – ringing activity in one of the directions. So we deduced that discrimination between owls already settled or not is not necessary.

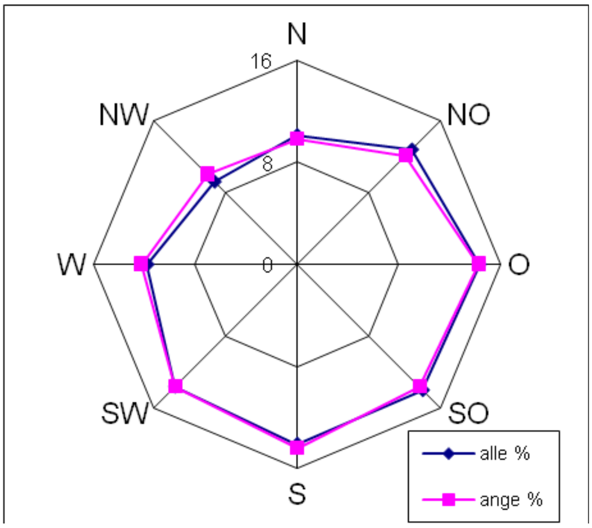

Figure 3: Parts in % of the directions of origin of all owls ringed as nestlings (n=5.236) or of those recovered after March 1st in the year following their year of fledging, thus those already settled (n=3.328; "ange"= settled)

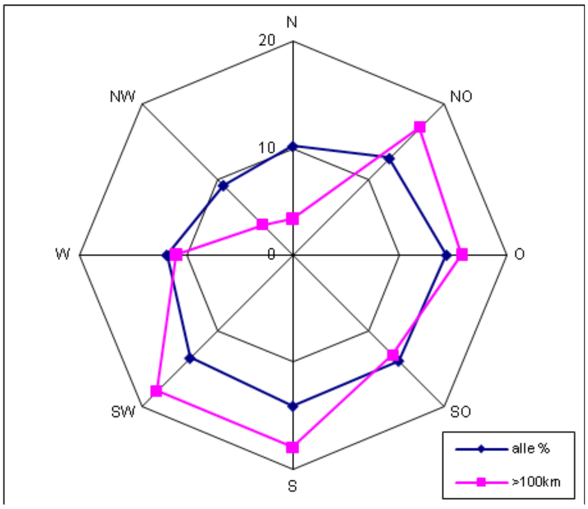

Figure 4: Comparison of the directions (parts in %) between all origins and those from >100km (n_{all}=4.556; $n_{>100km}$=506)

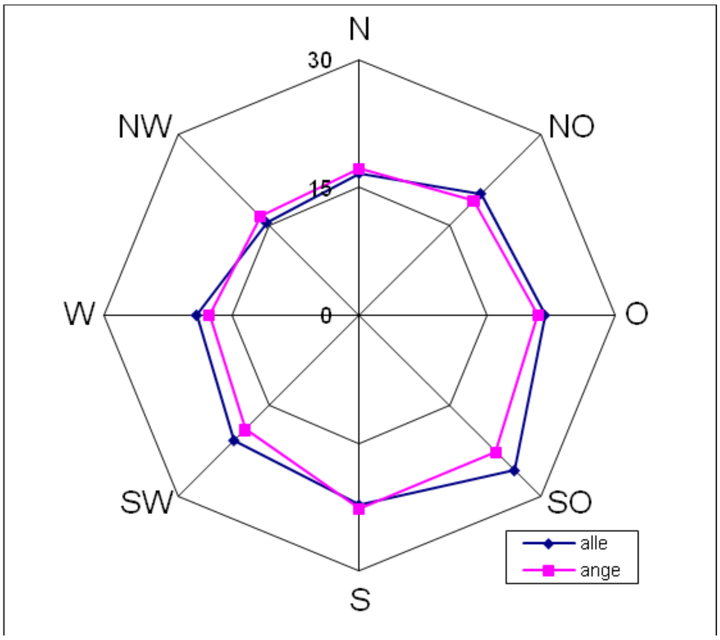

Figure 5: Median (km) of the distances of origin of the owls from fig. 3 (ange=settled)

When recovered, 359 were identified as ♂ and 452 as ♀. The directions of origin at the (first) recovery of these are given in figure 6. There seems to be no difference between the sexes. Totally different for the distance of origin (fig. 7): The median for the ♀ is almost twice as high as that for the ♂. For these lower medians there obviously is no influence of the direction of origin.

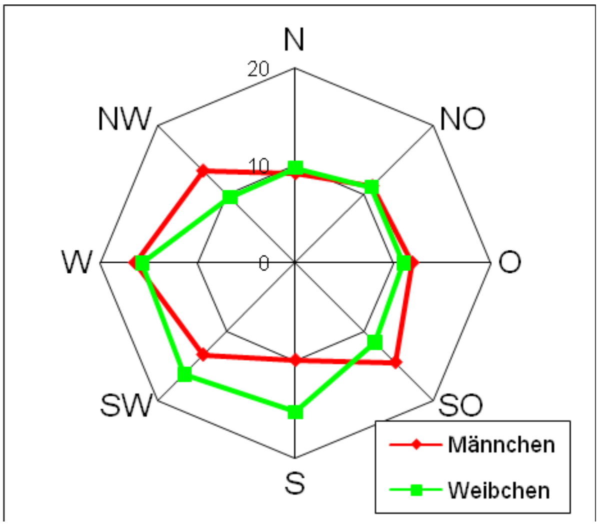

Figure 6: ***Direction*** of origin of the owls ringed as nestlings in % for the sexes ($n_{♂}$=359; $n_{♀}$=452; ♂= red)

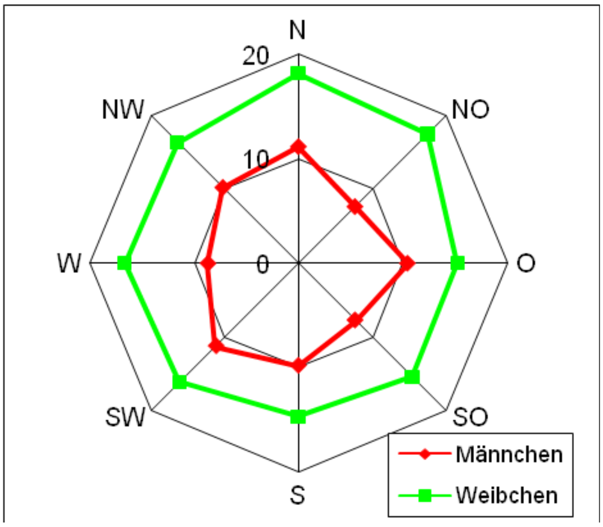

Figure 7: ***Distance*** of origin (median: km) of the owls in figure 6 for the sexes ($n_{♂}$=359; $n_{♀}$=452)

To answer the question, whether there was any correlation between the distances of immigration and the numbers of breeding pairs (as measure for density), not the latter ones themselves were at disposal but - as approximation - the yearly total numbers of ringed owls in the overall area of the Vogelwarte Helgoland 1974-2000 (communicated by O. GEITER, Vogelwarte Helgoland). Figure 8 allows the interpretation that years with a higher owl-density were those with the lower distances. No influence of the density of the resp. preceding year was detectable. In reverse no indication was found of an influence of the immigration distances on the density of the following year.

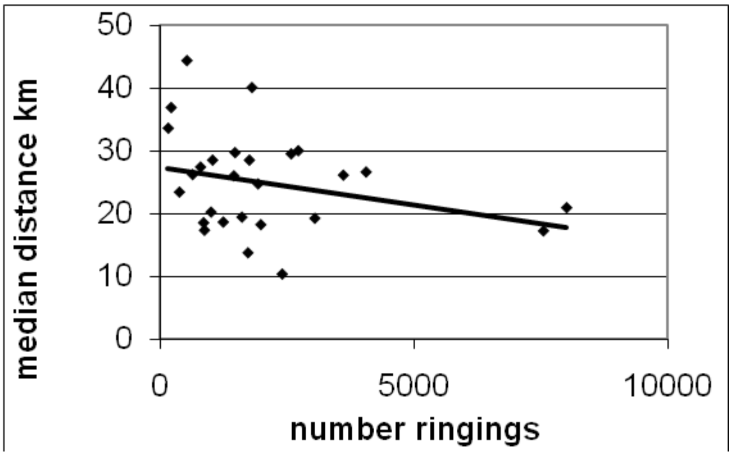

Figure 8: Relationship between the density of the barn owl population (as number of ringings per year) and the median of the immigration distance for the years 1974-2000

Far-wanderers
Already in the study of dispersal (KNIPRATH 2012) a special chapter had been dedicated to the far-wanderers. Following the definition of SAUTER (1956; all >100km) here 506 of the total of 4.556 belonged to this group (11.1 %; fig. 4). The maximum of immigration distance was at 483 km. It astonishes that only the direction of the North Sea (NW) and not that of the Baltic (NE) improves as influencing factor. The differences between the remaining directions indeed seem to be of minor importance.

3.2 Owls ringed as catches
Recoveries of barn owls not ringed as nestlings amounted to 1.755. Among these 1.955 each had only one recovery or was the first recovery in the cases of multiple recoveries. These last ones belonged to 329 individuals. For each of these multiple recoveries direction and distance in relation to the preceding recovery was calculated newly and these new data sets (n=698) were added to the first recoveries, now summing to 1.753 movements.

Likewise among the owls ringed as nestlings there had been 684 multiple recoveries of 419 individuals. Beginning with their second recovery they were added to the recoveries mentioned before. For them also directions and distances from the preceding sites of recovery were calculated newly. The number of data sets now amounts to 2.437.

The distribution of the recoveries over the years is shown with figure 9. Here we immediately detect the moderate increase since the 70ies and the very pronounced one in the median 90ies. The obligation by the German ringing schemes to control adult owls has had its effect.

To judge the directions of the movements found in the data we first should look at the really covered distances: 66 % of the owls (included those with unknown sex) moved less than 2 km (♂: 69.01 %; ♀: 74.32 %). All that took place within the villages; 42.5 % of the owls had been controlled again at the identical site (distance=0 km). At the other end of the scale the maximum is 556 km, altogether only 33 individuals (1.35 %) had covered more than 100 km and only 10 % more than 10 km between two controls. There we recognize the great site-fidelity of adult barn owls.

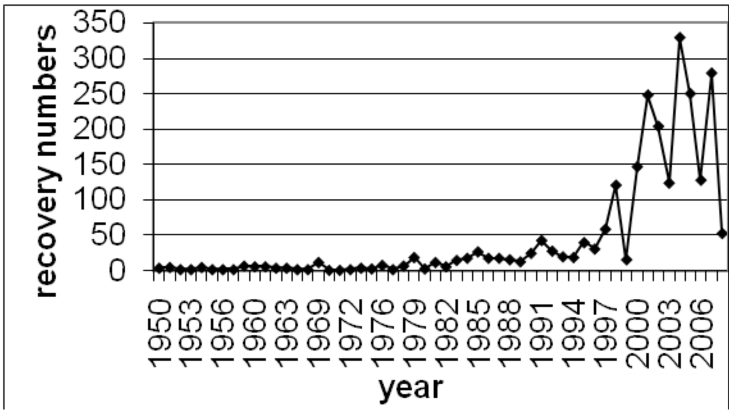

Figure 9: Distribution of the recoveries of all owl caught 1950-2008 (n=2.424)

Despite of the small numbers still remaining, in figure 10 we see again that immigration from the direction NW is less and that from eastern directions for the smaller distances is something, and clearly numerous for the greater distances.

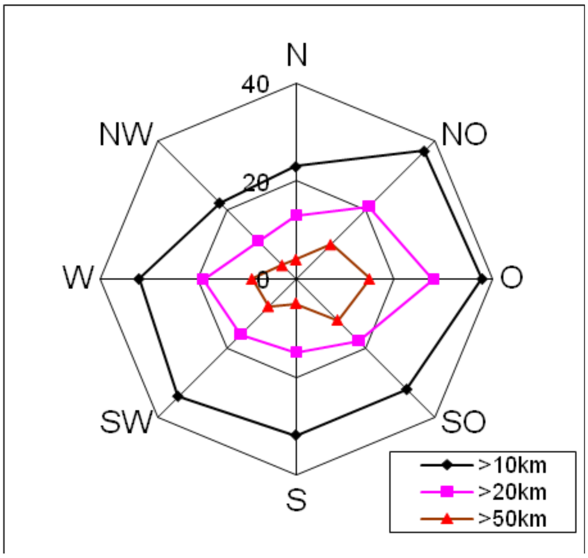

Figure 10: Direction of origin by distances (n_{10}=250; n_{20}=141; n_{50}=67)

The distance of origin for both sexes is given in the figures 11 and 12. (If the declaration of the sex differed between ringing and recovery, that of the ringing had been accepted. For such discrepancies for owls ringed as nestlings the sex was accepted as being unknown.) First we notice the very low distances (median 3 km at maximum) when compared to the owls ringed as nestlings. For the pattern of the median distances by directions (fig. 11) we don't find any explication. After all, the pattern of the means (fig. 12) shows a clear preference of the direction east. Indeed some of the owls, which had immigrated from direction east, had done so from distinctly greater distances.

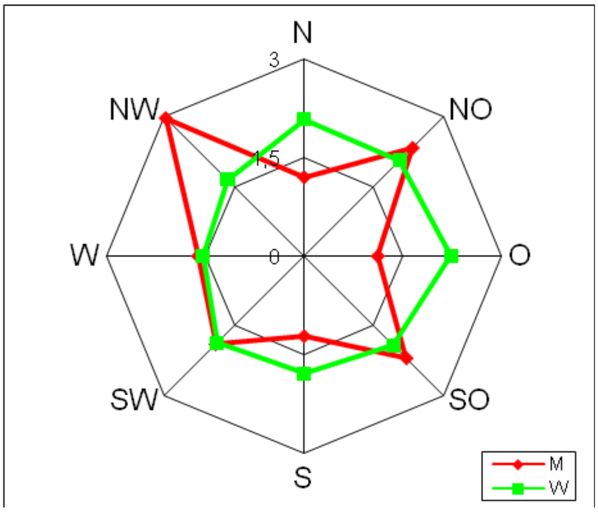

Figure 11: Median (km) of the immigration distances of catches identified as ♂ (n=157) or as ♀ (n=633; green)

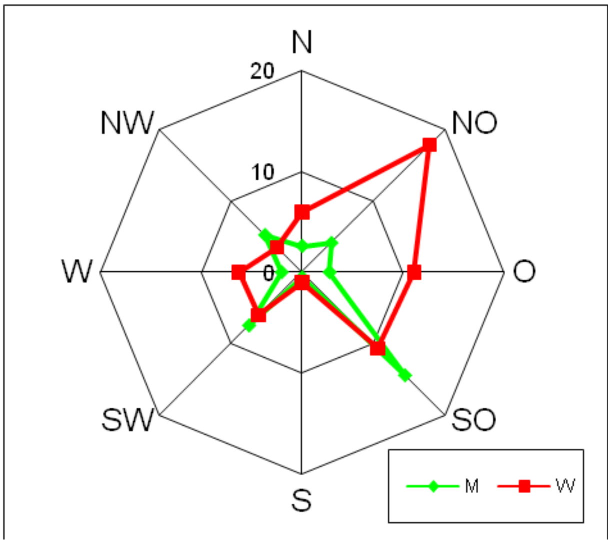

Figure 12: Mean (km) of the distances of origin of catches identified as ♂ (n=157) or as ♀ (n=633; red)

3.3 Partitions of the study area

As has been shown above, beginning with their second life-summer, barn owls scarcely move over greater distances. Owls which not had been ringed as nestlings, are not included here. So the results exclusively refer to owls ringed as nestlings. The general area of the lowland has been subdivided into 12 sub-areas with strait edges and of roughly similar extensions (fig. 13). They were analyzed each for their parts and distances per immigration direction.

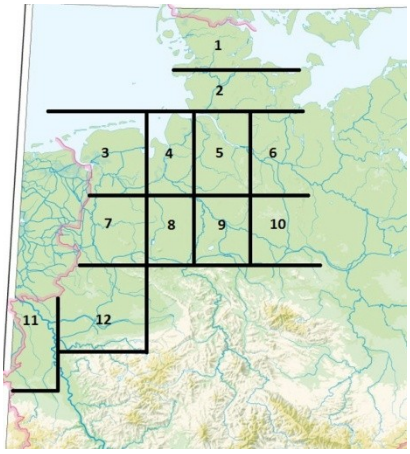

Figure 13: The analyzed parts of the northern German lowland with the approximate limits. The exact limits are given below for each of these parts. Limits not drawn in the figure are formed by the borders of the area of the Vogelwarte Helgoland (in the W: German frontier; in the E: frontier of Lower Saxony; in the N: coastal line) (basis of the map: orogeographic map of Germany of the “Bundesamt für Kartographie und Geodäsie)

Area 1: northern Schleswig-Holstein (>8,2^0 <10,6^0 E; >54,3^0 <54,85^0 N)
In this most northern study area a clear accentuation of southern directions of origin is visible (fig. 14), what from the entire material (figs. 3-5) possibly could have been suspected. Because of the two oceans only a few owls could have immigrated from West or East. The small number from North makes guess only a few ringings in Denmark or points to the distribution border not far in this direction. The immigration distances from direction South are clearly greater than all others (fig. 15); the directions W and E, those of the two seas, are heavily sub-represented. From South there is a clear difference between mean and median: Some immigrants came from far, two from >300 km or from 400 km.

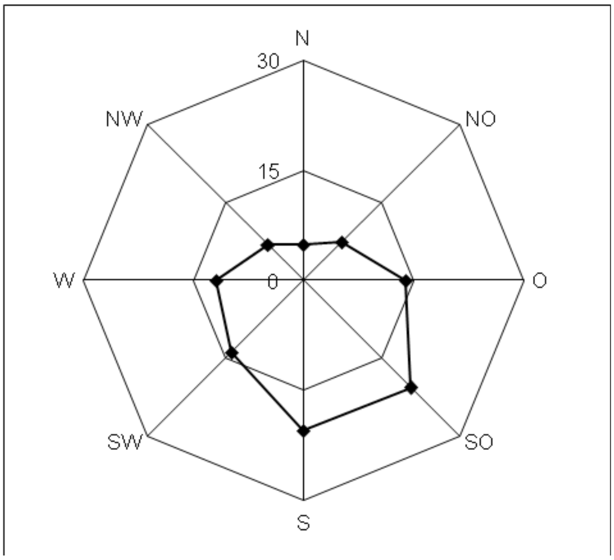

Figure 14: Parts (%) of the directions of origin of barn owls recovered in the area “northern Schleswig-Holstein”, ringed as nestlings (n=352)

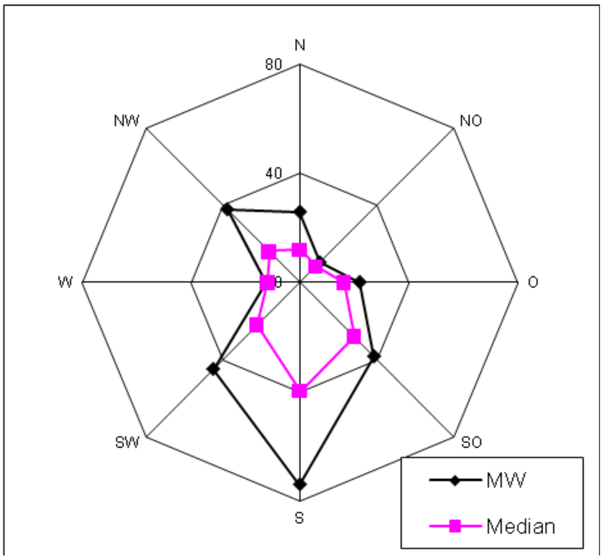

Figure 15: Means and medians of the distances of origin (km) of the recoveries from figure 14

Area 2: Southern Schleswig-Holstein (>8.2^0 <11.3^0 East; >53,79^0 <54,31^0 North)
As well as for the direction of origin (fig. 16) as for the corresponding distances (fig. 17) the lower values are found on the eastern side. Here is the Baltic. In contrast, the North Sea is not visible. This may lead back to that the majority of ringing took place nearer to the Baltic.

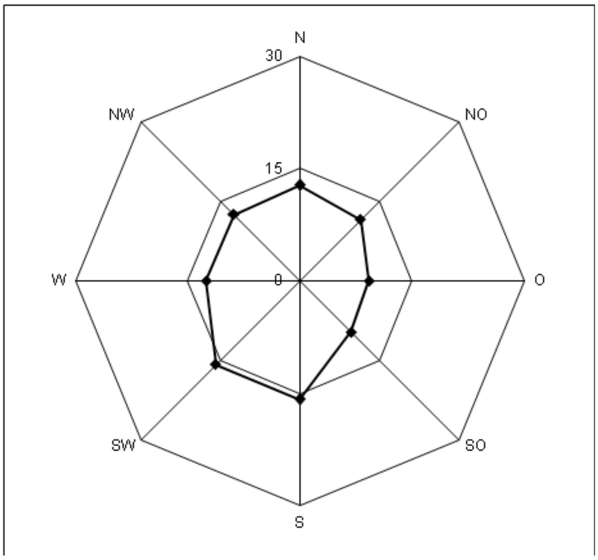

Figure 16: Parts (%) of the directions of origin of barn owls recovered in the area “southern Schleswig-Holstein”, ringed as nestlings (n=409)

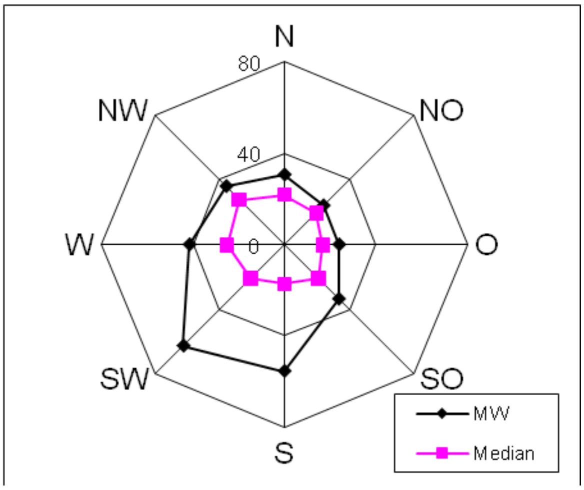

Figure 17: Means and medians of the *distances* of origin (km) of the recoveries from figure 16

Area 3: Eastern Freesia (>6,9^0 <8^0 East; >53^0 North [missing co-ordinates means: the border here is that of the area of the Vogelwarte Helgoland])
The distribution of directions of origin shows that from the direction North Sea there was no immigration (as could be expected). It astonishes that from W and SW, where indeed there live barn owls, as well there was only scarce immigration (fig. 18). The extremely far going conformity between the means and the medians of the distances of origin (fig. 19) prove that here no immigrants from greater distances had been recorded; the only exception is an owl from direction South with 374 km. This single value clearly increases the mean. All together these two values of equal height prove that in this area there had been only a few ringings, so that recruits would have been documented by low medians.

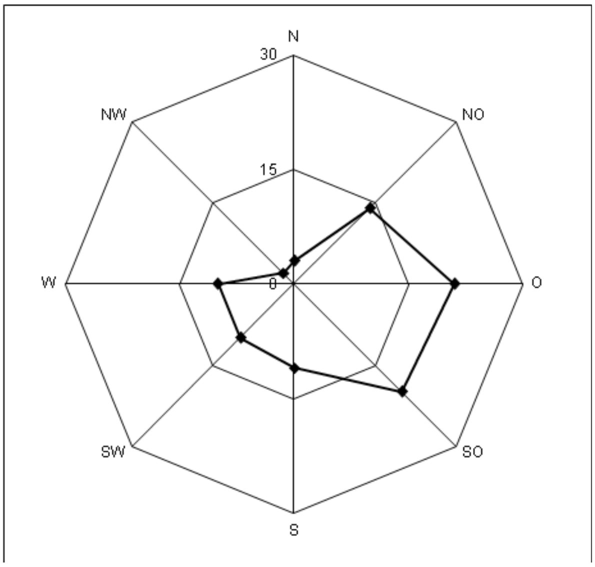

Figure 18: Parts (%) of the directions of origin of barn owls recovered in the area “East-Freesia” , ringed as nestlings (n=91)

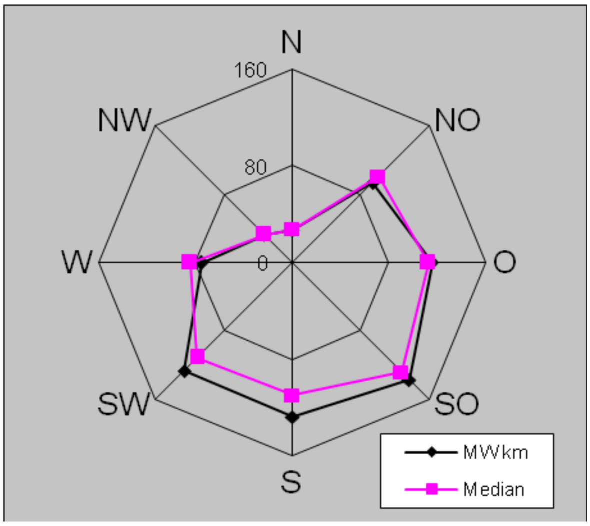

Figure 19: Means and medians of the *distances* of origin (km) of the recoveries from figure 18 (caution: the shaded figs. do have a double scale)

Area 4: Jade-Weser (>7,99^0 <9^0 East; >53^0 North)
Even clearer than in the previous area (3) the distribution of the directions of origin shows that immigration nearly exclusively took place from a south-eastern direction (fig. 20). Different from the preceding area means and medians differ distinctly (fig. 21). From W to S there has been immigration only from greater distances. There from we may derive that in this direction ringing only was performed at greater distances. On the other hand, the immigrants mostly do come from distances only half as great as those of the previous area.

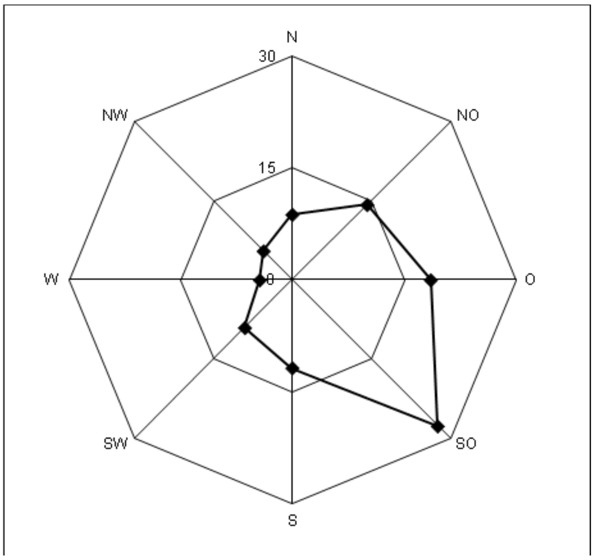

Figure 20: Parts (%) of the directions of origin of barn owls recovered in the area “Jade-Weser”, ringed as nestlings (n=365)

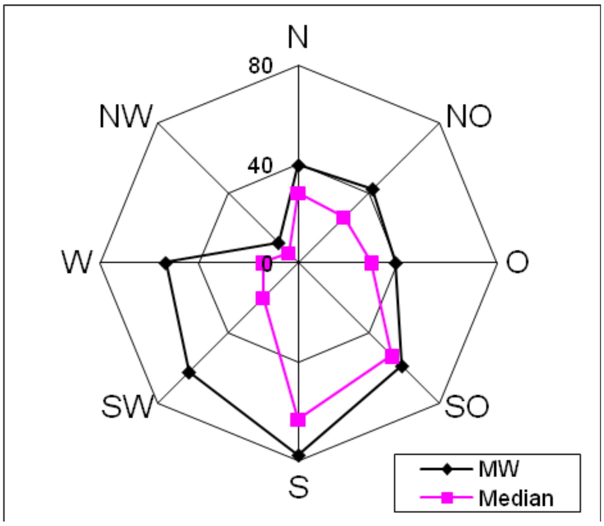

Figure 21: Means and medians of the *distances* of origin (km) of the recoveries from figure 20

Area 5: “Lower Elbe” (>8,99^0 <10^0 East, >52,99^0 <53,8^0 North)
Here again the directions around S are dominating, the directions North-Sea and Baltic as well are clearly visible (fig. 22). Some more immigrants do come from N, the direction Schleswig-Holstein. The immigration-distances (fig. 23) altogether are in the magnitude of the former area. The lower distances from NE to E prove that either in the area itself or in eastern vicinity extensive ringing took place. The recruits in part came from there.

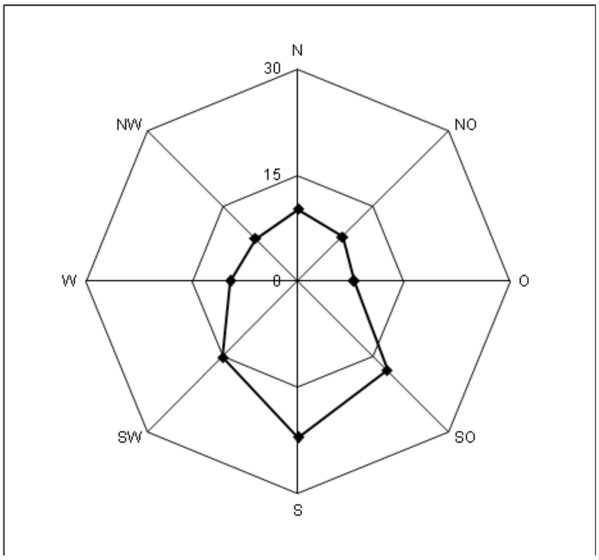

Figure 22: Parts (%) of the directions of origin of barn owls recovered in the area “Lower Elbe”, ringed as nestlings (n=304)

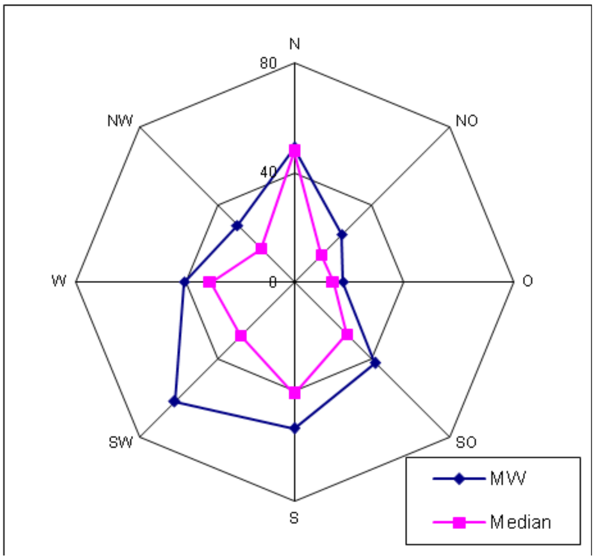

Figure 23: Means and medians of the *distances* of origin (km) of the recoveries from figure 22

Area 6: Hamburg East (>9,99° <11° East; >52,99° <53,8° North)
Most owls have S as direction of origin (fig 24). The very low medians and means of the distances make suggest that they had been ringed in a not to great distance. In the inverse ringing in western direction may have taken place in greater distances (fig. 25).

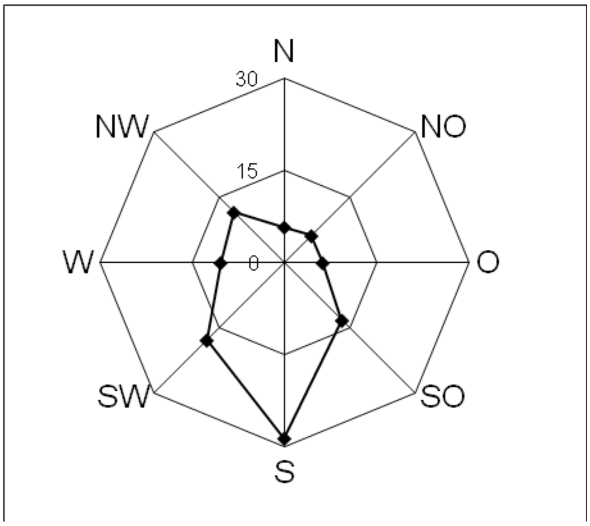

Figure 24: Parts (%) of the directions of origin of barn owls recovered in the area "Hamburg East", ringed as nestlings (n=241)

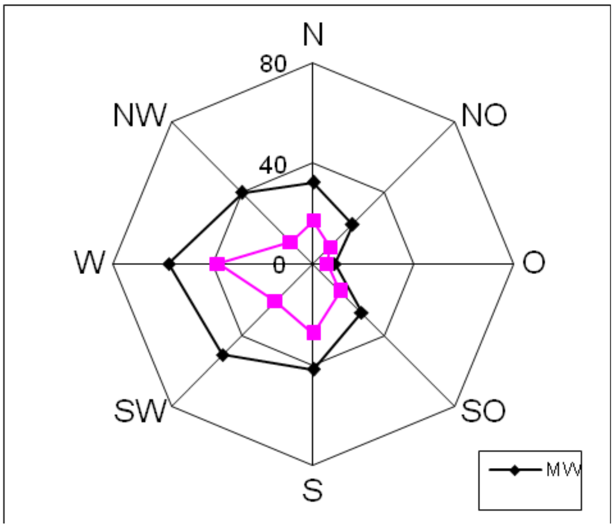

Figure 25: Means and medians of the *distances* of origin (km) of the recoveries from figure 24

Area 7: Ems (>6,9^0 <8^0 East; >52,19^0 <53^0 North)
The lack of immigrants from northern directions is caused by the neighbourhood of the North-Sea (fig. 26) and certainly as well by a lower ringing activity in area 3. However the scarce values from W do astonish considering the ringing activity in the Netherlands. Medians and means differ only slightly. Indeed both are clearly high: Ringing activities are all around, but in direction W obviously much nearer than in the other directions (fig. 27). Indeed the very low numbers do not permit a definite conclusion.

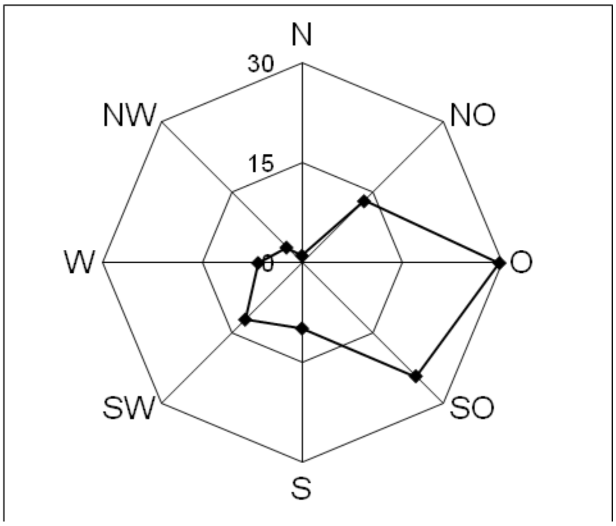

Figure 26: Parts (%) of the directions of origin of barn owls recovered in the area "Ems", ringed as nestlings (n=91)

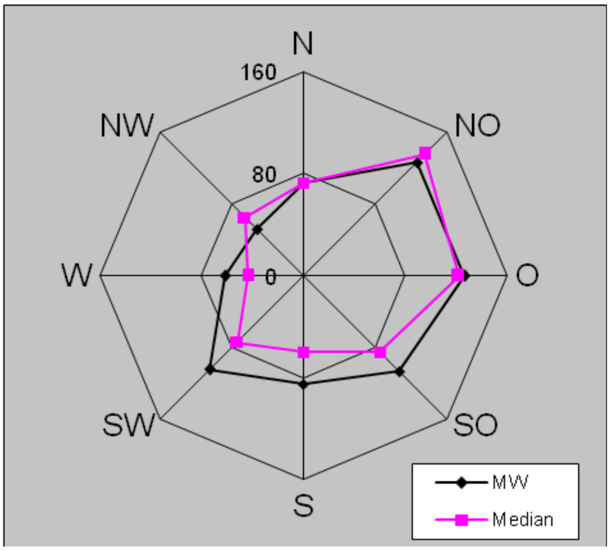

Figure 27: Means and medians of the *distances* of origin (km) of the recoveries from figure 26

Area 8: Cloppenburg (>7,99^0 <9^0 East; >52,19^0 <53^0 North)
This area follows S to the area Jade-Weser (area 4). As there, and also in the majority of the northern areas, most immigrants come from SE directions (fig. 28). The clearly higher n - as compared to the areas 4 and 7 – gives a higher weight to this result. The very low distance-values from direction NW make guess that these recoveries belong to owls ringed inside the area.

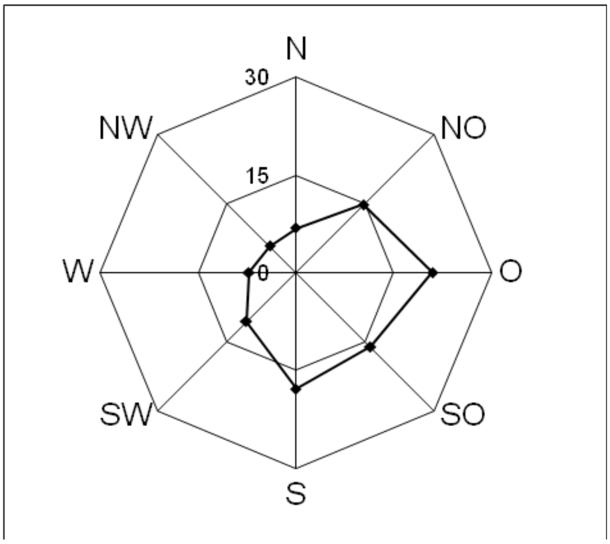

Figure 28: Parts (%) of the directions of origin of barn owls recovered in the area “Cloppenburg”, ringed as nestlings (n=458)

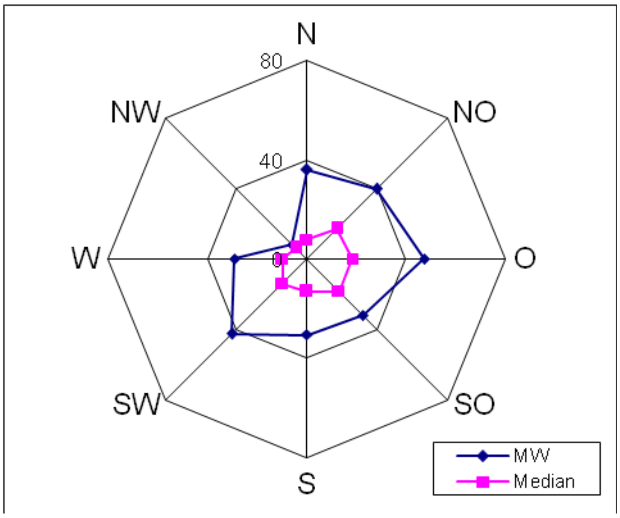

Figure 29: Means and medians of the *distances* of origin (km) of the recoveries from figure 28

Area 9: Weser-Aller (>8,99^0 <10^0 East; >52,19^0 <53^0 North)
As to the directions of origin we here don't find obvious differences (fig. 30). The distances of origin as well show very similar values, with slightly lower values from direction N compared to S (fig. 31). Due to the higher n these values seem to be even more reliable than those of the former area (8).

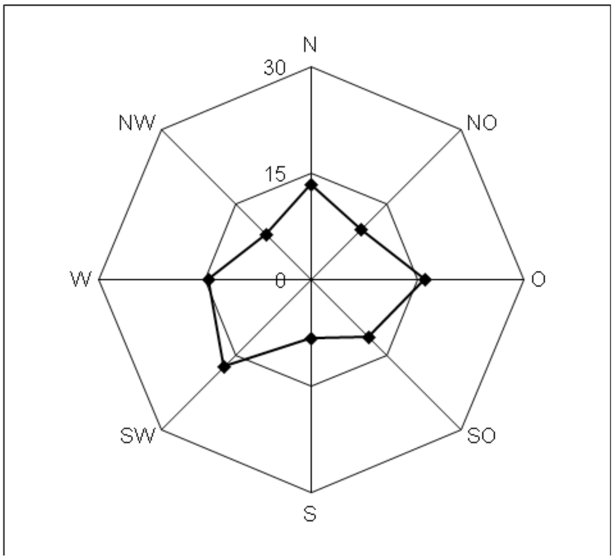

Figure 30: Parts (%) of the directions of origin of barn owls recovered in the area "Weser-Aller", ringed as nestlings (n=540)

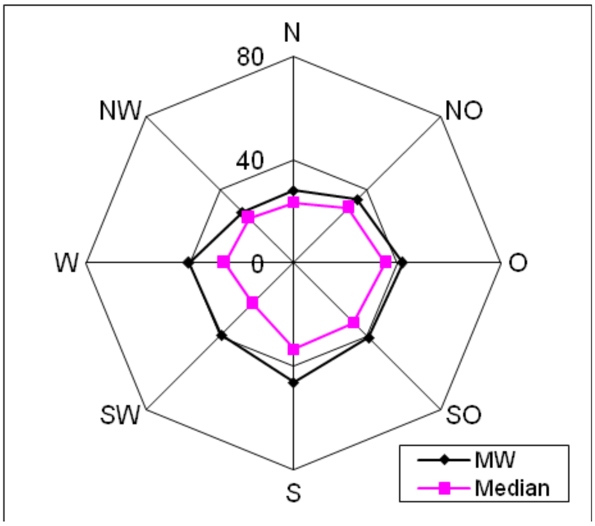

Figure 31: Means and medians of the *distances* of origin (km) of the recoveries from figure 30

Area 10: “Heide-Elbe” (>9,9^0 <11^0 East; >52,19^0 <53^0 North)
This area closes eastward to the preceding one (9). The numbers again are substantially greater than in this one, the greatest of any area at all. The distribution of the directions of origin is still more uniform (fig. 32). This uniformity of the directions of origin is also shown by the medians of the distances of origin. Judging from the means the owls from SW came from clearly greater distances of origin than from the other directions (fig. 33). Medians and means of the distances are considerably lower than in the preceding area.

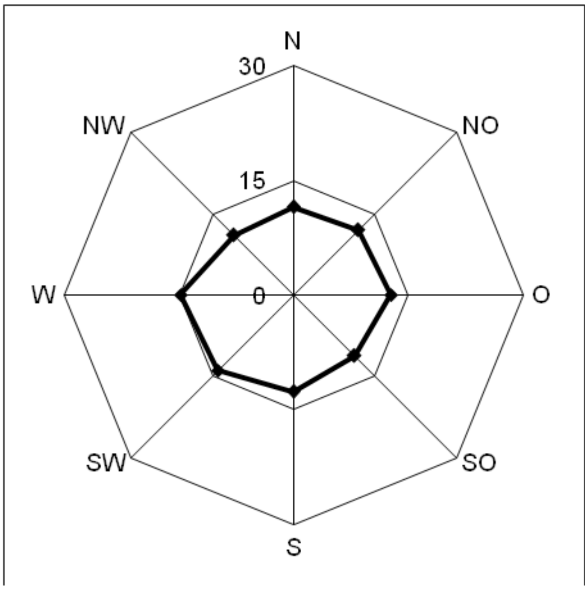

Figure 32: Parts (%) of the directions of origin of barn owls recovered in the area “Heide-Elbe”, ringed as nestlings (n=1.850)

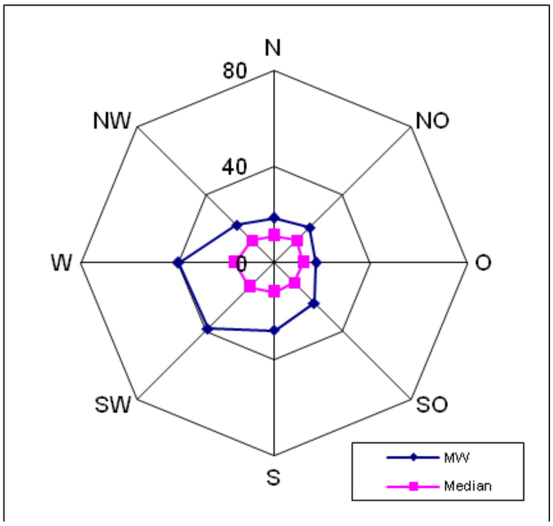

Figure 33: Means and medians of the *distances* of origin (km) of the recoveries from figure 31

Area 11: “left of the Rhine” (>6^0 <6,65^0 East; >50,6^0 <51,8^0 North)
This area at the same time is the most western and the most southern one of those studied here. As for the numbers of recoveries (n=99) it belongs to the three with the lowest n. The directions of origin (fig. 34) seem to indicate that to the west there is low ringing activity. The likewise very low values of distance (fig. 35) may illustrate that the “immigrants” from W in reality are none, but in the majority originate in the area itself. The high and at the time almost equally high distance-values from E and NE can be caused by ringing activities in greater distances.

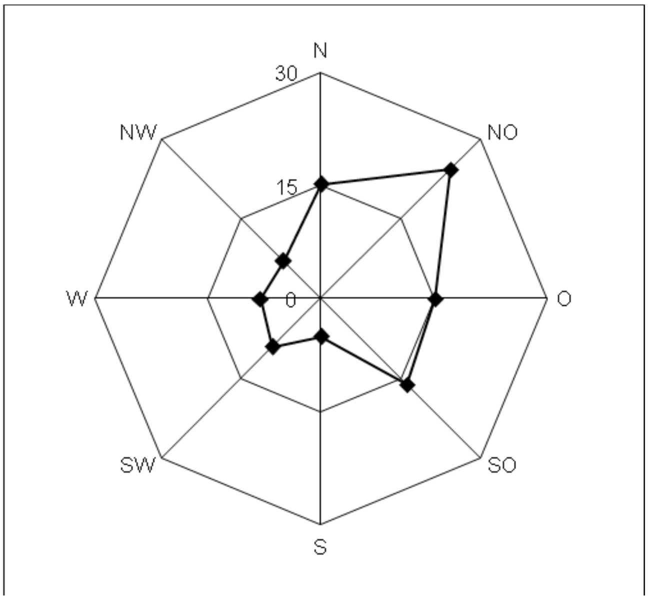

Figure 34: Parts (%) of the directions of origin of barn owls recovered in the area “left of the Rhine”, ringed as nestlings (n=99)

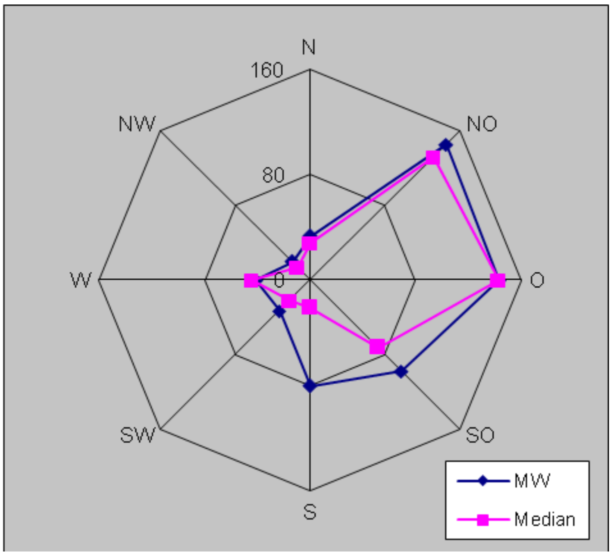

Figure 35: Means and medians of the *distances* of origin (km) of the recoveries from figure 34

Area 12: "Münsterland-Ruhr" (>6,65^0 <8^0 East; >51,3^0 <52,2^0 North)
Following eastwards to the preceding area this one indeed doesn't go as far southwards and reaches farer northwards. The distribution of the directions of origin is little spectacular: Only the direction NE diverges a little. More owls came from there, probably because there is some more ringing. In that direction we find the areas 8-9, with an n of 458 and 540 resp., and the area 10 with the highest n (1.850). Having 622 recoveries, it is the area with the second highest n of all areas.

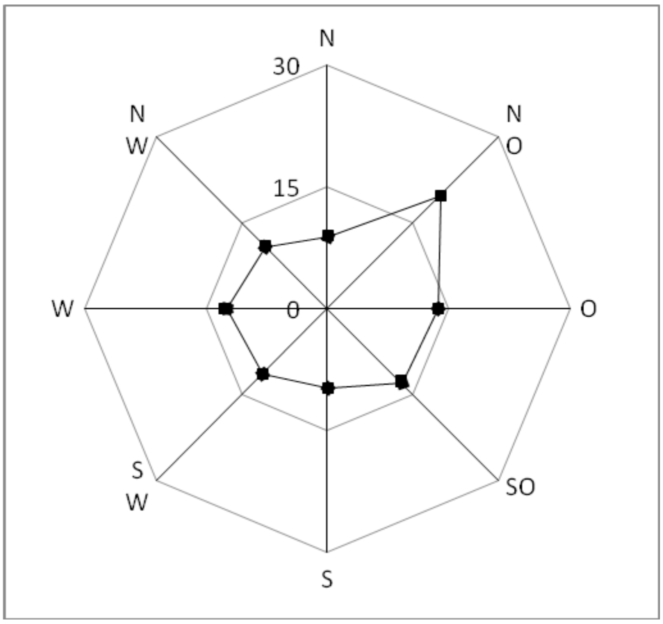

Figure 36: Parts (%) of the directions of origin of barn owls recovered in the area "Münsterland-Ruhr", ringed as nestlings (n=622)

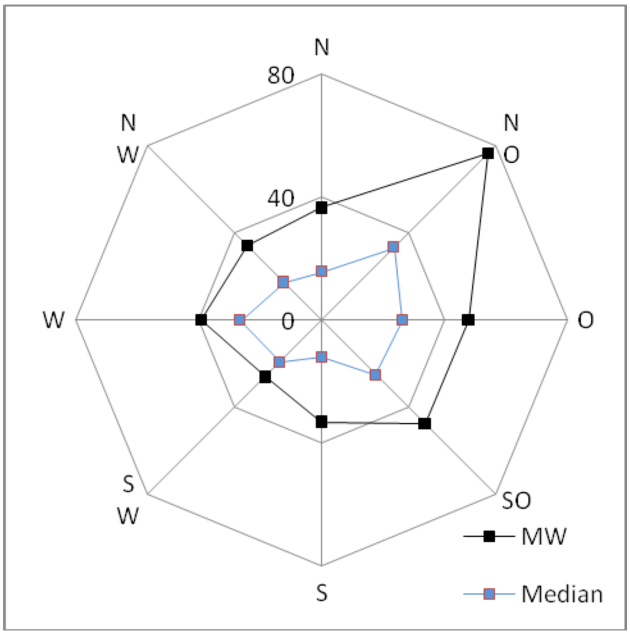

Figure 37: Means and medians of the *distances* of origin (km) of the recoveries from figure 36

3.4 The variation of the quantities and distances of origin by directions – depending on the n?

The parts of the directions of origin (figs. 14-36, even figure-numbers only) vary very clearly, depending on the area, from almost zero (fig. 32) to very strongly (several figs.). We followed the supposition, this magnitude of variation would be dependent on the sample magnitude. The figure 38 proves this supposition. We deduce that the distinct oscillations for some directions of origin in areas with an n not very great (<300) are rather randomly. The effective distribution of the directions of origin may be recognizable approximately reliable only with an adequate magnitude of the sample. Indeed in areas near to a coast (1-6) the influence of the two seas is recognizable.

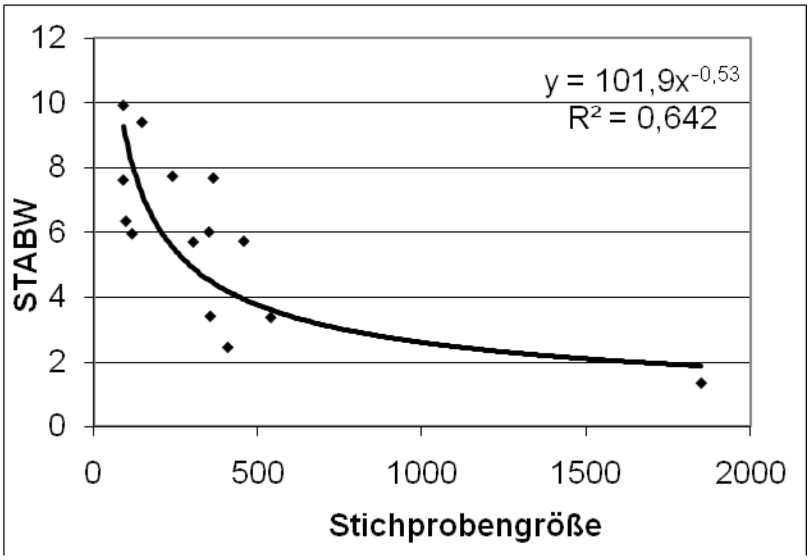

Figure 38: The scattering of the **quantities** of origin (as standard deviation STABW) of the part-numbers *by direction*) depending on the magnitude of the sample per area (from the figs. 14-37, even figure-numbers only)

Likewise the values for the parts of the origin-quantities per direction (figs. 14-37, odd figure-numbers only) scatter very clearly. As measure, the standard-deviations of these values per direction were compared (fig. 39). We see that the scattering between the areas from E to S uniformly is clearly greater. An explanation cannot be given.

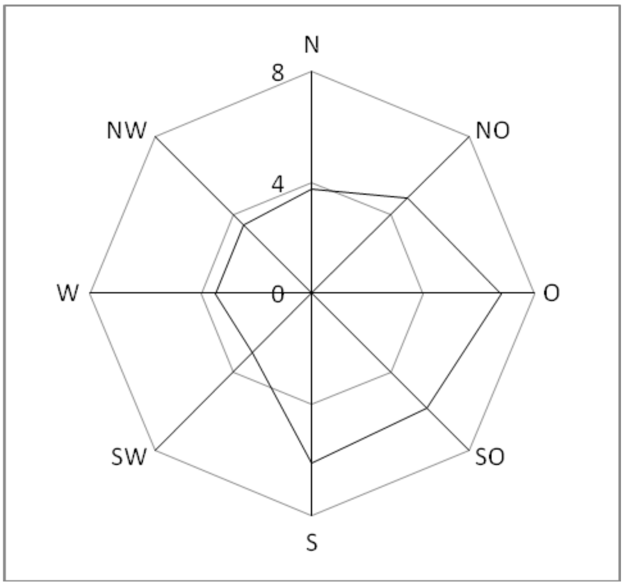

Figure 39: The scattering of the **quantities** of origin (as standard-deviations of the parts) of all 12 areas

The dependence of the distance of origin from the sample magnitude (fig. 40) is clear as well, that of the medians perhaps a little less than that of the means. This first one probably may be deduced from the fact that the great numbers are reached in areas, where several ringers are working. So here more nest-boxes are hanging with the consequence of a greater density of the owls and a nearer settlement of dispersing jong ones.

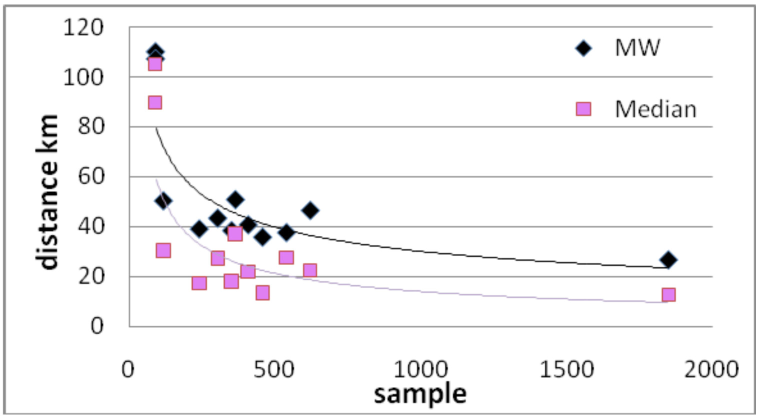

Figure 40: Median and mean of the distance of origin of all 12 areas as depending on the sample magnitude per area (from the figs. 14-37, odd figure-numbers only)

The scattering of the **distances** of origin *per sample magnitude* differs strongly likewise, as well for the means (fig. 41) as for the medians (fig. 42). There the values of the standard deviation of the means are greater than those of the medians. The scattering of the **distances** of origin per direction is very similar for means and medians (fig. 43). As for the distances of origin themselves (fig. 5) the directions around NW exhibit the smallest values. The values from NE to SW indeed are relatively greater.

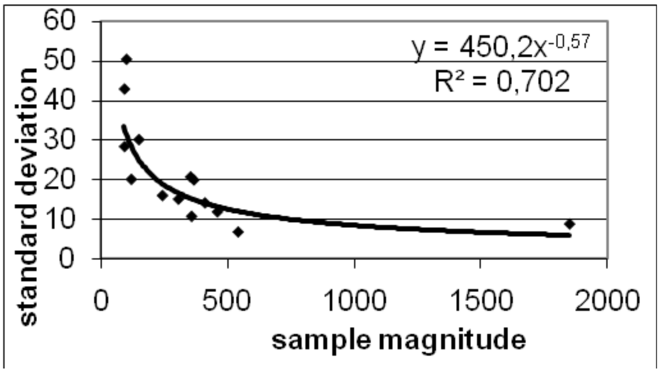

Figure 41: The scattering of the **distances** of origin (as standard-deviations of the *means* per direction) of all 12 areas as depending on the sample magnitude per area (from the figs. 14-37, odd figure-numbers)

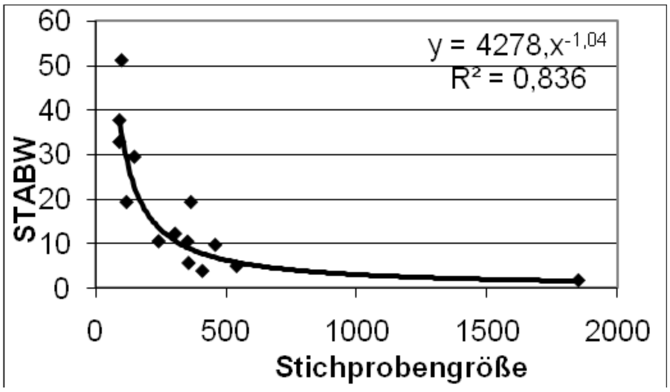

Figure 42: The scattering of the **distances** of origin (as standard-deviations of the *medians* per direction) of all 12 areas as depending on the sample magnitude per area (from the figs. 14-37, odd figure-numbers)

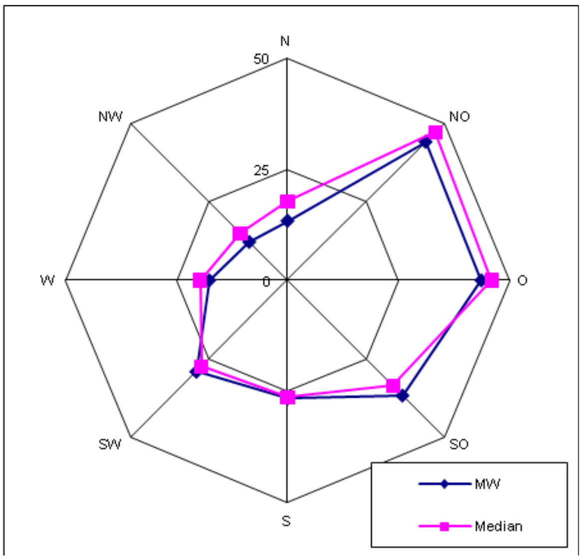

Figure 43: The scattering of the distances of origin (as standard-deviation of the means and medians) of all 12 areas

Discussion

For the study of the dispersal (KNIPRATH 2012, 2013) all barn owls **ringed** in the study area had been taken as basis, unconcerned where the recovery location was. Here it is exactly the opposite: We used the data of all owls **recovered** in the study area, independent of the site of ringing. These two data plots indeed overlap in a great extent but are not identical.

Generally: From a direction, in which there either are no barn owls (North Sea and Baltic, beyond the border of the species) or in which there is few ringing, naturally there are no immigrants or the eventual immigrants cannot be recognized. So these directions exhibit the smallest numbers. Different from the dispersal (for review: KNIPRATH 2010: 61) no proofs for the effectiveness of geomorphologic factors (other than the two seas) have been found. This probably is depending on the fact that in the entire study area nearly none of these (greater mountains, coherent woods or other greater waters), at least not in a particular extent in relation to the sub-areas studied, are present.

In the study of the dispersal ((KNIPRATH 2012: 105) the part of far-wanderers had been between 12.6 and 23.3 %. In contrast the part of these here had been calculated being only 11.11 %.

In the same study (Kniprath 2012: 102) it had become visible that in the northern German lowland in the dispersal there is a certain accentuation of the direction W to SW. That should correspond to a comparable accentuation of NE here. This indeed would presuppose that in the more eastern barn owl landscapes (in the eastern part of Germany) in the dispersal there is a similar tendency to the direction W to SW. That remains to be studied. In figure 12 for the distances of origin from 20 to 50 km in the total area an increasing accentuation of the direction of origin E had been noticed. This could be an indication for a tendency that in the dispersal of countries farer east the accentuation of the direction W to SW changes into one of W. The accentuation here (fig. 12) of the direction of origin E in the greater distances would be corresponding.

In the study of the sub-areas such an accentuation of an origin from E not has been noticed.

The basic knowledge deduced from the figures 14-37 (odd numbers only) is: Great samples don’t show any preferred direction of origin. Just as dispersing young owls generally move to all directions, so they later arrive at their future breeding regions from all directions without preference. That counts in the north German lowland in a sufficient distance from the two seas, North Sea and Baltic, and from the northern dispersion border. In the coastal regions this influence is recognizable (at least in the sub-areas 1-6). Here indeed we additionally find a strong accentuation of the directions south and southeast, which more likely may be explained by the fact that in this direction in the general area we find the crucial points of ringing activities (KNIPRATH 2013: 33; fig. 27). The influence of the two seas is still recognizable in the direction of origin of the total sample (fig. 3), the influence of ringing activities somehow less. This may be explained by the fact that the greater numbers of recoveries originate in the gravity centres of the ringing activities.

The greater scattering of the quantities of origin by direction (fig. 39) demonstrates exactly this: Between the sub-areas the values for the directions E to SE differ most.

Different from the dispersal (KNIPRATH 2012, 2013) no influence of geomorphologic properties has been found, despite of the influence of the two northern seas already described. This indeed could be different in the "barn owl islands" in the medium-altitude-mountains.

For the distances fits as well: the greater the sample, the smaller the distances (fig. 40). This indeed results with some certainty from the fact that in the sub-areas with the greater numbers of recoveries on one hand there do exist more ringers and on the other one more nest-boxes are installed, which facilitate a denser settlement (KNIPRATH 2013: 39). In addition, preferably here breeding adults are controlled so that own recruits are recognized more likely. That all results in lower distances of origin. We may accept the same explanation for the low scattering of the values of the distances of origin (figs. 41, 42).

The greater values for the distances of origin for the direction SE in the total materiel may result from that the centres of the ringing activities are found in the southeast of the study area (KNIPRATH 2012: 33).

Acknowledgements
The discussion with Dr. W. Fiedler/Vogelwarte Radolfzell has been very conductive for the formulation of the last issue. I wish to thank him.

Summary
The term "convenial" for the movements of Barn Owls leading to a local population is introduced in analogy to the term "dispersal" for the movements away from the natal locality.
Basing on the recovery-data of the "Vogelwarte Helgoland" concerning the northern German lowland the direction and the distance of origin of the barn owls recovered were analysed on one hand as a total and on the other hand divided into 12 sub-areas. One result was that the differences in quantities as well as in distances by compass-directions tended against zero with increasing recovery-numbers. Likewise the deviation values steadily diminished. As only those Barn Owls may be ordered following their origin which had been ringed, properties of origin depend on the numbers and distribution of ringers within and around a study area. A study basing on numbers of <300 recoveries cannot give reliable results concerning the origin of local Barn Owls.
As the only further influence we found the position of the study area in vicinity to the coast and to the northern distribution limit. Indeed, that from there with increasing vicinity only diminishing numbers of owls can come is rather trivial and cold be expected. No other geo-morphologic influences were detected. In the Barn Owl "islands" in the German medium altitude mountain region these indeed may exist.
From the increasing importance of the direction E in the total population with increasing distance of origin there was deduced that the Barn Owls in eastern Germany should tend to a certain preference of the direction W (instead of W-SW in the study area) when dispersing.

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