Transformation of Colour Degrees to Number of Jumps Using the Emelen Orientation Technipue

By
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(Med et dansk resumé: Forholdet mellem farvegrad og antallet af opspring i orienteringsforsøg med Emlens teknik.)

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INTRODUCTION

The Emlen-technique (EMLEN and EMLEN 1966) is very useful for orientation experiments, e.g. displacement experiments with nightmigrating passerines (RABØL 1969).

It is very simple and many experiments can be performed within a short season. This is of great importance since the number of possible experimental nights is very restricted. The migration season of nightmigrating passerines often is very short and more than 90 % of the population of a species can pass through the trapping area within two weeks. Further, the results obtained during moonlit nights are difficult to interprete (BROWN and MEWALDT 1968), and under an overcast sky the activity is depressed and mostly random directed (EMLEN 1967, RABØL 1969).

A sufficient number of experiments under the best conditions (starry sky and no moon) is, however, nearly always to be obtained, but it is a serious problem to decide whether the individual activity (the ink pattern) is statistically different from a uniformly distributed activity.

The two methods previously used by me (RABØL 1969) has not taken this problem into account. In this paper a third method which allows a statistical approach to the problem is described. The purpose of the paper is the presentation of this new method and a comparison of the results obtained by the three methods on the same material.

MATERIAL

The experimental birds were Garden Warblers *(Sylvia borin)* and Redstarts *(Phoenicurus phoenicurus)* trapped on Hesselø 20.-22.5.1969.

The following experiments were performed:

1) Hesselø 20.-21.5.1969, 22^{55}-00^{45}, wind NW 3-4, temperature 8-9° C, cloud cover 0-1/8, and good visibility. 5 Garden Warblers and 11 Redstarts (4 of the Redstarts showed no activity and are not included in the tables).

2) Hesselø 21.-22.5.1969, 23^{45}-01^{25}, W 2, 8° C, 3-4/8, and good visibility. 11 Garden Warblers (3 of which showed no activity) and 7 Redstarts.

3) Tisvilde, North Zealand (25 km ESE of Hesselø) 5.-6.6.1969, 23^{20}-00^{50}, no wind, 10° C, 3-5/8, and good visibility. 6 Garden Warblers and 7 Redstarts (1 showed no activity).

These birds were kept in Zoological Laboratorium in Copenhagen in the period 22.5. to 5.6. The light: dark rhythm was shifted 8 hours counterclockwise (dark 13-19).

METHODS

I. First is simply *estimated* whether there is activity in a preferred direction at all. The dispersion of the activity is described as small, medium, great or uniform. If the responses fall in one of the three first categories the average direction is then estimated (mostly to the nearest 11¼°).

The results when using this method are given in Table 1 and Fig. 1A.

II. The second method is the one used by RABØL (1969). The circular paper is divided into 16 sectors of 22½° each. The colour degree (scale 1-10) of each sector is estimated. The colour degrees (x) are transformed into »activity values« (y) following $y=1,4^{X-1}$. The 16 »activity values« are added as vectors, and a mean vector calculated. All mean vectors less than 0,18 are omitted.

The use of an expontential scale with a base greater than 1, instead of a linear one, was introduced because it was supposed that the amount of ink deposited from a given activity (e.g. 3 jumps) was more easily seen if there had been little activity previously, than if there had been strong activity. Hence the difference in activity corresponding to colour degrees 8 and 9 should be greater than the one between colour degrees 1 and 2. The selection of 1,4 as base was done intuitively. Activities which were at first sight estimated as oriented between medium and great dispersed yielded in the later calculations mean vectors down to 0,14-0,17. This was the cause to the selection of a lower mean vector at 0,18.

The results following this procedure are given in Table 2 and Fig. 1B.

III. The third method begins as in II with the estimation of the degree of colouring in each of the 16 sectors. Each colour degree is transformed to a number of jumps and these 16 values are added as vectors.

Concerning this transformation: The amount of ink in the sectors is supposed to be proportional to the activity in the sectors. In a spectrophotometer the ink concentration corresponding to each colour degree was measured. The procedure was as follows:

A 5 % (w/w) solution of eosine in distilled water was used as ink. 4 22½° sectors of each colour degree were taken (selected from 4 different papers). The combined sectors of each colour degree were boiled in 1 minute in 140 ml. of water. Nearly all the eosine had now been extracted from the paper. The solution was further diluted 25 times and its transmittance at 515 nm. measured. This yielded the following (relative) concentrations for colour degree 3-10: 305, 877, 2228, 3621, 8884, 12610, 14146 and 28567. The concentrations of colour degrees 1-2 were not significantly different from the blind. Further an other test was undertaken. 4 new sectors of colour degrees 3-8 were boiled in 2 minutes in 300 ml. of water. The solutions were diluted 10 times before the transmittance was read. This yielded the following (relative) concentrations: 1223, 1773, 3621, 4335, 9151, 13077.

The two series are given in Fig. 1. where the ordinate gives the log concentration. Both series are approximately straightlined. The relations between the colour degrees and the concentrations therefore seem to fit well exponential series with the bases 1,80 and 1,61 respectively. A base of 1,7 could be used as an appropriate mean proportional. The two straight lines cut the colour degree 1 in the concentrations 159 and 398, which yield an average concentration of *1 sector of colour degree 1* on approximately 70.

We now have to find the average amount of ink deposited per jump. I may refer to some experiments performed with Robin *(Erithacus rubecula)* at Røsnæs in October 1969.

Through a small hole in the funnel just above the inkpad were counted 135 jumps of 7 Robins, 75 jumps of 4 Robins and 35 jumps of 1 Robin respectively. Between the measurements eosine solution and water were filled on to the pad in order to fit the extremes (amount and concentration)

Table 1. Garden Warbler *(Sylvia borin)* G and Redstart *(Phoenicurus phoenicurus)* R, method I. Estimation of the preferred direction and dispersion of activity.

Tabel 1. Havesanger (Sylvia borin) *G og Rødstjert* (Phoenicurus phoenicurus) *R, metode I. Skøn af gennemsnitlig aktivitetsretning og spredning i aktivitet (small, medium, great og uniform = lille, middel, stor og ensartet spredning).*

Species, no. *Art, nr.*	Date *Dato* 1969	Direction *Retning*	Dispersion *Spredning*
G 593	20-21.5.		uniform
G 575	–	NW, 315°	medium
G 578	–	ENE, 68°	medium
G 577	–	(NW) NNW, 332°	small
G 362	–	NNE-NE, 34°	great
G 412	21-22.5.		uniform
G 415	–	NNW-N, 349°	small
G 674	–	N, 0°	medium
G 389	–	N, 0°	small
G 403	–	ENE, 68°	great
G 521	5-6.6.	NNE-NE, 34°	small
G 415	–	NNE, 23°	great
G 508	–	NNE-NE, 34°	medium
G 505	–	N, 0°	small
G 737	–		uniform
G 389	–	NNW, 338°	medium
R 589	20-21.5.	ENE, 68°	great
R 595	–	NW, 315°	medium
R 613	–	NW, 315°	great
R 390	21-22.5.		uniform
R 698	–	NNE, 23°	small
R 688	–		uniform
R 690	–	NNE, 23°	medium
R 421	–	NNW-N, 349°	small
R 486	5-6.6.	NE, 45°	small
R 525	–	NNW (N) 353°	small
R 495	–		uniform
R 698	–		uniform
R 491	–	N-NNE, 11°	small

Table 2. Garden Warbler and Redstart, method II. Mean vector and activity after RABØL (1969).

Tabel 2. Havesanger og Rødstjert, metode II. Gennemsnitvektor og aktivitet efter RABØL *(1969).*

Species, no. *Art, nr.*	Date *Dato* 1969	Mean direction *Gennemsnitretning*	Mean vector length *Gennemsnitlig vektor-længde*	Activity *Aktivitet*
G 593	20-21.5.	146°	0,13	17,2
G 575	–	326°	0,11	18,8
G 578	–	84°	0,15	19,2
G 577	–	352°	0,25	95,9
G 362	–	38°	0,23	78,5
G 412	21-22.5.	49°	0,06	17,2
G 415	–	0°	0,08	17,6
G 674	–	8°	0,22	58,2
G 389	–	349°	0,36	36,4
G 403	–	45°	0,04	19,6
G 521	5-6.6.	31°	0,51	104,0
G 415	–	21°	0,19	41,8
G 508	–	35°	0,27	69,9
G 505	–	355°	0,48	168,3
G 737	–	325°	0,08	17,6
G 389	–	349°	0,08	109,5
R 589	20-21.5.	98°	0,21	22,8
R 595	–	326°	0,21	73,0
R 613	–	296°	0,20	32,8
R 390	21-22.5.	180°	0,05	16,8
R 698	–	26°	0,33	29,0
R 688	–	326°	0,03	16,4
R 690	–	10°	0,17	28,6
R 421	–	351°	0,30	55,2
R 486	5-6.6.	38°	0,28	40,0
R 525	–	349°	0,38	128,2
R 495	–	349°	0,10	68,8
R 698	–	38°	0,16	138,6
R 491	–	2°	0,30	26,4

used during the previous night experiments. Of course, the same amount and concentration were aimed in these experiments, but water and ink were filled on the same pads from experiment to experiment (the water evaporated and the ink was consumed). The amount of ink deposited per jump was measured as 49, 18 and 64 respectively (measured in the same unity as the first of the previously mentioned series). The two greater values are very near to the amount of eosine in 1 sector of colour degree 1 (70). The number of jumps corresponding to a given colour degree is therefore approximately $1{,}7^{x-1}$ (where x denotes the colour degree). Corresponding to colour degrees 1-10 this yield the following jump numbers: 1, 2, 3, 5, 8, 14, 24, 41, 70, and 119.

Table 3. Garden Warbler and Redstart, method III. ++ and + denote P less than 0,01 and between 0,01 and 0,05 for $z = \frac{1}{2}n \cdot r^2$. (+) and ÷ denote P less than 0,05 and more than 0,05 for $z = n \cdot r^2$.

Tabel 3. Havesanger og Rødstjert, metode III. ++, + og (+) viser tre sandsynlighedsniveauer af aftagende størrelse, hvor aktiviteten er konkluderet at være rettet i gennemsnitretningen. Ved ÷ er aktiviteten ikke signifikant forskellig fra en ensartet fordelt aktivitet.

Species, no. *Art, nr.*	Date *Dato* 1969	Activity *Aktivitet*	Mean Vector Gennemsnitvektor		z	P
G 593	20-21.5.	19	146°	0,151	0,432	÷
G 575	–	23	326°	0,220	1,113	÷
G 578	–	23	82°	0,271	1,692	÷
G 577	–	285	352°	0,400	45,66	++
G 362	–	203	41°	0,322	21,00	++
G 412	21-22.5.	19	41°	0,140	0,373	÷
G 415	–	20	0°	0,182	0,664	÷
G 674	–	97	8°	0,414	16,60	++
G 389	–	65	349°	0,497	16,07	++
G 403	–	34	45°	0,058	0,114	÷
G 521	5-6.6.	386	32°	0,682	179,8	++
G 415	–	75	22°	0,286	6,113	+
G 508	–	174	36°	0,418	30,39	++
G 505	–	798	355°	0,630	316,6	++
G 737	–	20	325°	0,169	0,573	÷
G 389	–	334	349°	0,128	5,507	(+)
R 589	20-21.5.	30	107°	0,333	3,327	(+)
R 595	–	157	323°	0,385	23,25	++
R 613	–	52	299°	0,285	4,218	(+)
R 390	21-22.5.	18	180°	0,110	0,217	÷
R 698	–	46	28°	0,499	11,44	++
R 688	–	17	326°	0,059	0,059	÷
R 690	–	43	3°	0,212	1,931	÷
R 421	–	122	350°	0,433	22,84	++
R 486	5-6.6.	73	38°	0,385	10,83	++
R 525	–	481	349°	0,528	134,2	++
R 495	–	158	349°	0,163	4,198	(+)
R 698	–	497	37°	0,245	29,93	++
R 491	–	39	3°	0,417	6,775	+

Table 4. Comparison between the three different methods. + in the first column of each method indicates, that the demand of the columns heading is fulfilled. This is not the case for angles in parentheses.

Tabel 4. Sammenligning mellem de tre metoder. + betyder, at søjlerne overskrift er opfyldt. For vinkler vist i parentes er dette krav ikke opfyldt.

Species, no.	Material in Table 1		Material in Table 2		Material in Table 3	
	Art. nr. small medium	Direction *Retning*	mean vector > 0,18	Direction *Retning*	P < 0,05 ($z = n \cdot r^2$)	Direction *Retning*
G 593						
G 575	+	315°		(326°)		(326°)
G 578	+	68°		(84°)		(82°)
G 577	+	332°	+	352°	+	352°
G 362		(34°)	+	38°	+	41°
G 412						
G 415	+	349°		(0°)		(0°)
G 674	+	0°	+	8°	+	8°
G 389	+	0°	+	349°	+	349°
G 403						
G 521	+	34°	+	31°	+	32°
G 415		(23°)	+	21°	+	(22°)
G 508	+	34°	+	35°	+	36°
G 505	+	0°	+	355°	+	355°
G 737						
G 389	+	338°		(349°)	+	349°
R 589		(68°)	+	98°	+	97°
R 595	+	315°	+	326°	+	323°
R 613		(315°)	+	296°	+	299°
R 390						
R 698	+	23°	+	26°	+	28°
R 688						
R 690	+	23°		(10°)		(3°)
R 421	+	349°	+	351°	+	350°
R 486	+	45°	+	38°	+	38°
R 525	+	353°	+	349°	+	349°
R 495		–		(349°)	+	349°
R 698		–		(38°)	+	37°
R 491	+	11°	+	2°	+	3°

Of course many objections could be raised against this rough calculation:

1) The varying amount and concentration of eosine on the inkpad from experiment to experiment.

2) The use of Robin instead of Garden Warbler and Redstart. The two last species were however not available in October when the need of transformation from colour degree to jumps was appreciated. According to several observations the activity (and ink) patterns of the three species are however very identical.

3) A jump starts from the inkpad. Very often the activity between two jumps (in warblers and chats) consists of a fluttering behavior just beneath the wirescreen. The number of wingbeats in a fluttering period very often exeeds 15 or 20, and the angle covered by the moving body could be as large as between 90° and 180°. This holds true for observations in daylight. The exact behavior during the nights in »Zugunruhe« and under the starry sky is not yet known.

4) Unfortunately sectors in which there are no activity (ink) at all have been labelled as colour degree 1 (a reminiscence of method II). When the activity is small and several sectors are without any trace of ink, the lenght of the mean vector therefore

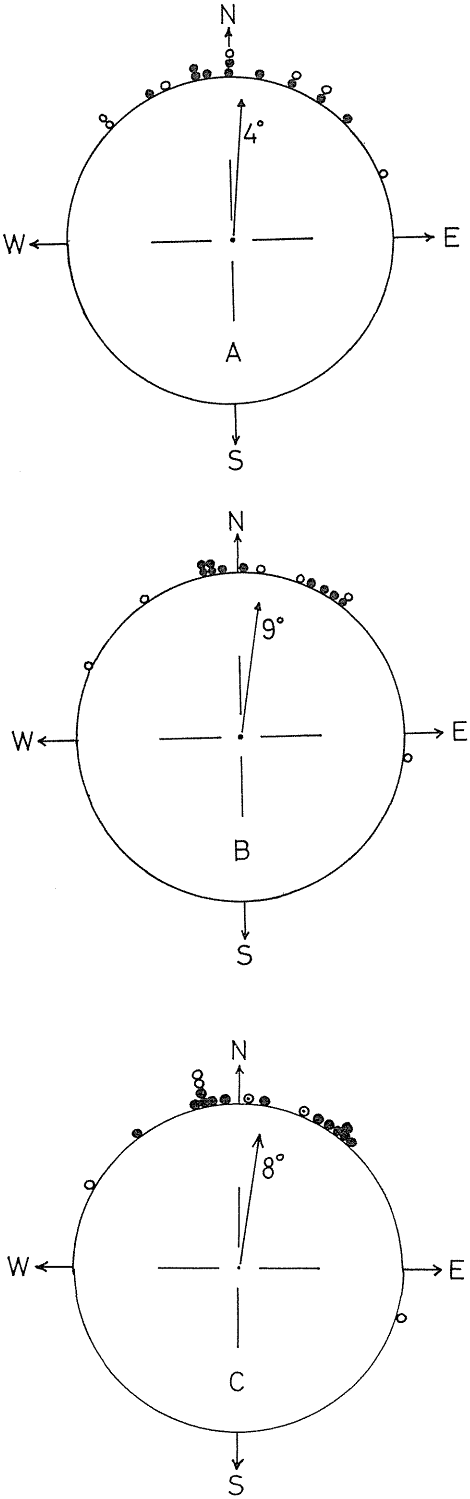

Fig. 1. The material in Table 1, 2 and 3 (A, B and C). The polar coordinates of the three mean vectors are: 4° and 0,870, 9° and 0,813, and 8° and 0,833 respectively. In A (method I) black and white dots refer to estimated directions which the dispersion are designated small and medium respectively. In B (method II) black and white dots refer to mean vectors with lenghts at least 0,25 and between 0,18 and 0,24 respectively. In C (method III) black and black-white dots denote P less than 0,01 and between 0,01 and 0,05 respectively for $z = {}^1/_2 n \cdot r^2$, and white dots P less than 0,05 for $z = n \cdot r^2$.

Fig. 1. Materialet fra Tabel 1, 2 og 3 (A, B og C). Hver plet står for et individs gennemsnitretning. Jo mere sort pletten er desto større statistisk forskellighed fra en ensartet aktivitet. De tre gennemsnitvektorer er: 4° og 0,870, 9° og 0,813, og 8° og 0,833.

becomes too small in the calculation, $z = n \cdot r^2$. The increase in z due to a greater n is more than compensated for by the much lesser r^2.

We now have to estimate the ratio of independent activity. The above mentioned 35 jumps Robin is taken as an example:

During the experiment the sky was totally overcast. If celestial stimuli direct the activity there should be a uniform distributed activity under the overcast sky. If the jumps are directional independent of each other (HAMILTON 1966), the average angle between the directions of subsequent jumps should be 90°.

The inkpad was divided into 8 sectors of 45° and the directions of the feet were measured before the jumps. Out of a total of 35 jumps I could measure the directions of 20. The average angledifference between two following jumps was 78°. This is close to 90°. Therefore, in this experiment at least the half of the jumps might be considered as directional independent of each other. Several observations of birds in the funnel confirm this ratio as appropriate – at least in the daytime (see also BROWN and MEWALDT 1968). After a jump the bird does not simply rush back to the inkpad keeping the same body orientation. It jumps more or less obliquely down. It also often rotates on the inkpad before a new upward jump.

The activity of each individual is expressed in a mean vector following the cal-

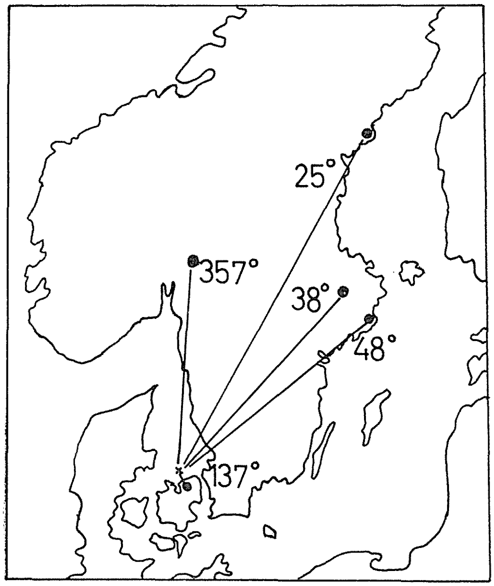

Fig. 2. Recoveries an late May-July (presumably on the breeding grounds) of birds banded as migrants at Hesselø. The bird in the 38° direction is a Garden Warbler, the other Redstarts.

Fig. 2. Genfangster fra sidst i maj til juli incl. (d. v. s. i yngletiden) af fugle ringmærket som trækgæster på Hesselø. Fuglen i 38°-retningen er en Havesanger, de andre er Rødstjerte.

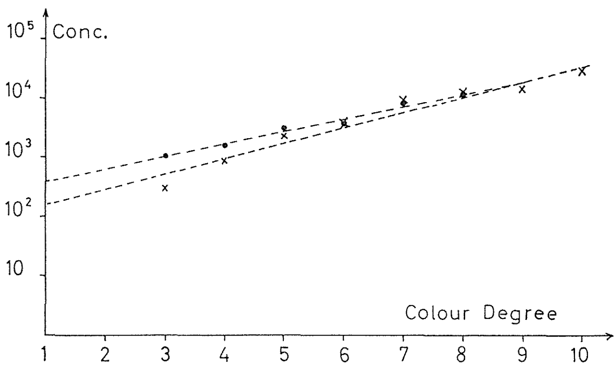

Fig. 3. The relative concentrations of the two colour degree series mentioned in the text. The first serie is given with crosses, the second with dots (multiplied with 6/7 in order to yield the same concentration as serie 1). There seems to be a straightlined correspondence between the colour degree and the log concentration.

Fig. 3. Forholdet mellem farvegrad 1-10 og koncentrationen af blæk i logaritmisk skala. Der er vist to måleserier. Retlinetheden i log.skalaen viser en eksponentiel korrelation mellem farvegrad og konc.

culation mentioned of BATSCHELET (1965), p. 11. The individual mean vector is tested against a uniform distributed activity following the test $z=n{\cdot}r^2$ mentioned in BATSCHELET (1965) Table 20.1, p. 28. The material is presented in Table 3 and in Fig. 1C. In the figure black and black-white dots denote P less than 0,01 and between 0,01 and 0,05 respectively for $z=\frac{1}{2}n{\cdot}r^2$, and white dots P less than 0,05 for $z=n{\cdot}r^2$.

DISCUSSION AND CONCLUSION

In the Tables 1-3 the same material is presented treated in three different ways which are compared in Table 4.

The similarities are very pronounced. In Table 4 the claim of being sufficiently directed is fulfilled by 17, 16 and 19 birds. 12 birds are labelled sufficient according to all three methods (if there was no correlation between the methods the number should be 6,1). The differences in mean directions (Fig. 1) are not tested statistically (e.g. the two sample test mentioned by BATSCHELET (1965), p. 33), but are certainly insignificant. Especially estimations (method I) should however be omitted. The experiments are performed to test a model, and therefore estimations could be biased to fit the model too well – at least in the mind of other scientists. The use of appropriate statistics yields more reliable results.

Fig. 2 shows the recoveries of migrants banded at Hesselø. Only recoveries from late May-July (the breeding season) are included. The polar coordinates for the vector addition of the 4 Norwegian-Swedish birds are 27° and 0,945. The similarity between Fig. 1 and Fig. 2 is reasonably good and a strong indication that the activities of the birds in the funnels are oriented in their true (instantaneous) migration directions.

In the next year a species specific ratio of the independent activity will be estimated. The amount and concentration of ink will be hold strictly constant, and the species specific amount of ink deposited per jump determined. The number of jumps in each sector can then be determined exactly through photometri. This however involves considerable work and a short cut thorugh a more differentiated colour degree scale (15 or 20 units, including a zero group) will yields results which probably are insignificantly less reliable.

SUMMARY

A method is described in which the colour degrees are transformed to number of jumps.

The ratio of independent activity is estimated to about ½.

The mean vector of each individual could now be calculated and tested against a uniform distributed circular activity.

On the same material this method is compared with 1) the simple estimation of the average direction of an activity which is supposed to be different from a random distributed activity and 2) the method described by RABØL (1969) after which all mean vectors less than 0,18 are rejected. As Fig. 1 and Table 4 clearly show, the three methods yield very identically results.

ACKNOWLEDGEMENTS

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DANSK RESUMÉ

Forholdet mellem farvegrad og antallet af opspring i orienteringsforsøg med Emlens teknik.

I 1969 omtalte jeg her i DOFT forsøg med geografisk forflytning af Havesanger fra Blåvand til Ottenby. Ved samme lejlighed præsenterede jeg en delvis selvkomponeret metodik med hensyn til udregning af den gennemsnitlige aktivitetsretning. Desuden kom jeg med et kriterium for, hvor meget spredningen i aktivitet måtte være, for at man kunne anse gennemsnitretningen for »god nok«.

Da flere (herfra landet) har været lidt skeptiske både med hensyn til metodens anvendelighed og med hensyn til, om der fremkom sikre ændringer i »trækretningerne« (Fig. 4-5 i RABØL 1969) efter forskydningen fra Blåvand til Ottenby, skal disse to punkter behandles her i det danske resumé. Dette er iøvrigt noget forskelligt udformet fra selve artiklen, der ikke former sig som et »forsvar« for den tidligere anvendte metode, men koncentrerer sig om at beskrive en ny og bedre metodik.

1) *Metoden:*

Både efter den ny og gamle metode indeltes papiret på tragtens inderside i 16 sektorer à $22^1/_2$°, og for hver sektor blev bedømt en farvegrad, skala 1-10. I den *gamle metode* gik jeg ud fra, at antallet af opspring (y) svarende til en bestemt farvegrad steg eksponentielt som funktion af farvegraden (x) således: $y=1{,}4^{X-1}$. Basen 1,4 var ret så intuitivt valgt, og det absolutte antal opspring svarende til hver farvegrad var *ikke* kendt. Dette bevirkede, at jeg ikke kunne anvende statistik til at afgøre, om det enkelte individs aktivitet var signifikant forskellig fra en ensartet aktivitet. Jeg manglede den nødvendige enhed (1 opspring). Jeg kasserede blot enhver gennemsnitvektor, hvis skalare værdi var under 0,18 (i nogle tilfælde under 0,22).

Den *ny metode* går ud på følgende: Antallet af opspring i hver sektor anses for proportional med den i sektoren afsatte blækmængde. Dernæst måles hvor meget blæk et gennemsnitopspring afsatte, ligesom den gennemsnitlige blækmængde i sektorer bedømt til farvegraderne 1-10 måles (spectrophotometri). Antallet af opspring svarende til farvegraderne 1-10 blev herved fundet til at være: 1, 2, 3, 5, 8, 14, 24, 41, 70 og 119 ($y=1{,}7^{X-1}$). Det enkelte individs aktivitet kunne nu testes mod en ensartet fordeling, og hvis forskellen ikke var statistisk signifikant blev retningsvalget kasseret.

I Tabel 1-3 har jeg på det samme materiale anvendt 3 forskellige metoder til at skønne eller beregne den gennemsnitlige aktivitetsretning og afgøre om denne er »god nok« (d. v. s. at aktivitetsspredningen ikke er for stor). Den første metode er blot et *skøn* af både retning og spredning svarende til Fig. 6-7 i RABØL (1969). Den anden metode er den tidligere anvendte ($y=1{,}4^{X-1}$), og den tredie metode den nysudviklede omtalt ovenfor. På Fig. 1 og i Tabel 4 er de 3 metoder sammenlignede. Forskellen mellem dem er helt ubetydelig – især gælder dette metoderne 2 og 3, hvor samtlige 16 »gode« retningsvalg i 2 indgår i 3's 19 »gode«. Konklusionen heraf må være, at metode 2 (RABØL 1969) er en udmærket behandlingsmåde for et orienteringsmateriale, dog tilstræbes en videreuddeling af metode 3.

2) *Retningsforskellen Blåvand - Ottenby:*

Forskellen mellem Blåvand efteråret 1968 og Ottenby 26.8.1968 blev undersøgt med et Fishertest, hvilket ikke var ganske korrekt, omend forsvarligt. Det mest relevante test turde være et cirkel-test nævnt i BATSCHELET (1965). Dette test giver en sandsynlighed for overensstemmelse mellem Ottenby 26.8. og Blåvand efterårene 1967+68 på blot mellem 0,02 og 0,025, hvorfor man kan konkludere en forskel. Nu var forflytningsretningen fra Blåvand til Ottenby (ØNØ-Ø) ikke den mest udslagsgivende for en kompenserende fugl, der trak SSØ ved Blåvand. I efteråret 1969 har jeg forflyttet fugle fra Hanstholm til Dueodde (ØSØ-SØ), og fra Skagen til Sydlangeland (S). Normaltrækretningerne i Hanstholm var (i forsøgsperioden) Ø og ved Skagen SØ. Efter forflytningerne trak Dueodde- og Langelandsfugle mest henholdsvis SV-NV og N-NØ, d. v. s. de kompenserede meget klart for forskydningerne (artikel i trykken i »Ornis Scandinavica«).

Af Fig. 1-2 fremgår iøvrigt, at aktiviteten i forsøgene ved Tisvilde og på Hesselø er rettet omtrentlig mod yngleområderne (højredrejningen er ikke signifikant men sikkert reel nok). Dette skaber jo en tillid til teknikkens anvendelighed i retning af at give meningsfulde resultater.

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Rapport fra sjældenhedsudvalget med oversigt over godkendte forekomster 1965-69

Af

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(With a Summary in English: Report of the Rarity-Committee for 1965–69.)

INDLEDNING

For kun få år siden var den ornithologiske sagkundskab tilbageholdende med at acceptere forekomster af større sjældenheder, der ikke var dokumenterede med *bevis,* helst i form af fuglenes mere eller mindre sørgelige rester. Eftersom ornithologer nu om stunder er udrustet med en kikkert og ikke med en bøsse som for 75 år siden, må dette princip i dag forekomme både urimeligt og upraktisk. Dertil kommer, at kendskabet til feltidentifikationen af fugle har udviklet sig betydeligt, og gode felthåndbøger med pålidelige oplysninger om både almindelige og sjældne arter er blevet enhver ornithologs eje. Den tidligere indstilling var dog ganske velbegrundet. Forelå der et bevis, kunne i hvert fald bestemmelsen til enhver tid kontrolleres, hvorimod påstande om forekomster fastslået ved iagttagelse, helt stod for iagttagerens regning. Betegnelsen ornitholog dækkede den gang som nu slet og ret over en fugleinteresseret, og blandt fugleinteresserede er alle grader af kyndighed og forsigtighed repræsenteret. Få iagttagere forstod, at man ikke uden videre kunne forlange at blive troet, når man påstod at have set og bestemt sjældne fugle i naturen, så meget mere som sådanne bestemmelser uden for snævre kredse ofte blev betragtet som vanskelige. Blandt amatørornithologer var man for så vidt også skeptiske, men lod sin vurdering af troværdigheden helt afhænge af, om iagttagerne var én bekendte som dygtige feltornithologer – hvori alene lå, at de var dygtige til at bestemme fuglene i naturen.

I al saglig skrift og tale underbygger