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MS received 25 July 1982

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Mindre meddelelser

NON-MAGNETIC ORIENTATION IN PIED FLYCATCHERS *FICEDULA HYPOLEUCA*

Beck and Wiltshko (*Z. Tierpsychol.* 60 (1982): 41-46) have demonstrated magnetic North as a primary genetically fixed compass reference for the southwesterly standard direction in the Pied Flycatcher. However, this finding does not exclude that the standard direction could also be fixed genetically in relation to other compass references than magnetic North.

In the summer and autumn of 1982 we carried out some preliminary orientation experiments with juvenile Pied Flycatchers, to find out whether the autumn standard direction could be established in the absence of appropriate magnetic information.

On June 20 and 22 5 nestlings were taken from their boxes at Strødam, North Zealand and hand-raised. The age was about 7-8 days. After one week and hence forward the birds were transferred to wire cages (30×30×30 cm), each applied with two bar magnets fixed in the middle and lower part of two opposite sides in the level of the two perches. The magnets produced a strong vertical field within the cage (magnetic North pointed downwards). The strength was not measured exactly but exceeded the normal field intensity about 4 to 5 times in all parts of the cage.

The strong vertical field was heterogenous, and small but varying horizontal components were found

within the cage. As the cages were turned about every second day, there should be no possibility for the birds to establish the standard direction in relation to magnetic North.

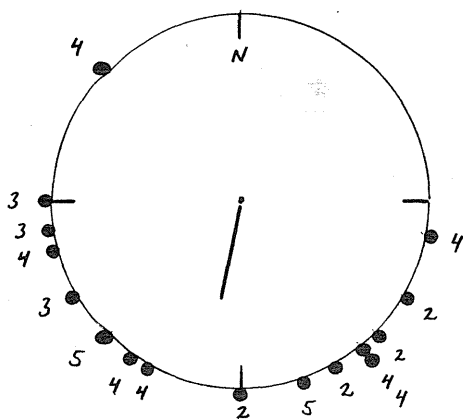
On 11 nights between July 4 and August 3 the birds were placed outdoors 3 to 5 hours in their cages under the starry sky.

During August 14 to 29 the birds spent 7 nights under a starry sky in Emlen-funnels. The orientation was registered as described by Rabøl (*Dansk Orn. Foren. Tidsskr.* 75 (1981): 97-104).

Bird no. 1 failed to show any migratory activity. The remaining 4 birds showed a total of 16 unimodal orientations. The no. of the birds and their mean directions are denoted at the figure. The mean vector is directed towards 191° (»S-SSW«), and the concentration is 0.53 (0.01P<0.02, Raleigh-test). In the remaining 12 experiments the activity was dis-oriented, weakly bimodal or zero.

The conclusion is that the flycatchers are oriented approximately in the standard direction.

The strong and vertical magnetic field in the cages and funnels made it impossible for the birds to evolve and establish migratory orientation using magnetic North as a compass reference. Furthermore, a star compass could not evolve as a secondary compass calibrated by the magnetic compass.



Probably, the orientation is established in relation to the starry sky – and possibly, the standard direction in one way or another is fixed genetically to stellar North as a compass reference.

The Pied Flycatcher thus seems to be endowed genetically with two compasses, one magnetic and another which perhaps is related to the stellar sky.

If the stellar compass was calibrated by some unknown primary compass, the same compass may also have calibrated the magnetic compass in the experiments of Beck and Wiltschko.

Wiltschko (XVII Congr. Int. Ornith., Berlin 1978 (1980): 561-565) argues that a single »inherited« compass reference is sufficient. Other compass references may be added through calibration. Such a system evades »superfluous« storage in the DNA-code. However, it is difficult to see why a small increase in the storage per se should be disadvantageous. On the contrary, redundant genetic information may increase the fitness. Furthermore, it is not yet clear whether the orientation of a juvenile long-distance migrant is based solely on a compass system. More complex and additional systems are probably involved making the demands of a genetical basis beyond that of just a single compass reference.

The experiments were carried out at Strødam Biological Field Station, University of Copenhagen.

Dansk resumé: Forsøg af tyskerne Beck og Wiltschko har vist, at unge fluesnapperer kan orientere sig efter Jordens magnetfelt – hvis de vokser op i og testes i det naturlige magnetfelt eller i et kunstigt magnetfelt af samme styrke og hældningsgrad som det naturlige felt.

Nattrækkende småfugle kan også bruge stjernehimlen som kompas for orienteringen, men ofte opfattes det således, at stjerne-kompasset er tillært og opstået gennem overføring af information fra et medfødt magnetisk kompas.

I juli-august 1982 blev der foretaget orienteringsforsøg med 5 unge Brogede Fluesnapperer ved Strødamlaboratoriet i Nordsjælland. Fuglene var taget på reden ca. 7 dage gamle.

Fuglene voksede op i bure med kraftige stangmagneter, således at det ikke var muligt, at bruge det magnetiske kompas til fastlæggelse af normaltrækretningen (»SV«).

I perioden 4. juli til 3. august var fluesnapperne 11 nætter udendørs under stjernehimlen.

Der blev foretaget forsøg på 7 stjerneklare nætter mellem 14 og 29. august ved hjælp af tragtmotoden. En kraftig stangmagnet var anbragt lodret i bunden af tragten. Fuglene har derfor ikke på noget tidspunkt – hverken mens de var i burene eller tragtene – haft mulighed for at overføre retningsinformation fra magnetfelt til stjernehimlen.

Fluesnapperens retningsvalg fremgår af figuren, hvor tallene refererer til fuglenes nummer. Nr. 1 var ikke aktiv. Gennemsnitvektoren peger mod »S-SSV«, og den er statistisk signifikant. Man kan opfatte den som rettet i normaltrækretningen.

Konklusionen af forsøgene er, at fuglene – udover magnetkompasset – må have endnu et medfødt kompas til rådighed.

Der er sikkert tale om et stjernekompas: Fuglene er i stand til uden i egentlig forstand at skulle lære det at orientere sig i normaltrækretningen i forhold til stjerne-nord. Der skal dog flere forsøg til, før man kan være helt sikker i denne konklusion.

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