

# **Programmed and flexible: long-term *Zugunruhe* data highlight the many axes of variation in avian migratory behaviour**

Benjamin M. Van Doren, Miriam Liedvogel and Barbara Helm

## **SUPPLEMENTARY MATERIAL**

### **APPENDIX 1**

#### **SUPPLEMENTARY METHODS**

*Origin and Maintenance of Birds:* Birds originated from the following locations: Austrian stonechats: Lower Austria (48°14'N, 16°22'E; n = 157); Irish stonechats: Iveragh Peninsula near Killarney, in the County of Kerry, Ireland (c. 52°N, 10°W; n = 83); African stonechats (data partly published in Helm and Gwinner 2006): Lake Nakuru region, Kenya (0°14'S, 36°0'E; n = 20), and Mount Meru region, Tanzania (3°50'S, 36°5'E; n = 4), and 1 F1, Kenya x Tanzania; Siberian stonechats: vicinity of Naursum National Park (c. 51.5°N, 63°E; n = 53), Kazakhstan.

Detailed descriptions of breeding and raising conditions have been published elsewhere (Gwinner et al. 1987, Helm 2003, 2009). Briefly, juveniles were taken from their nests while still depending on their parents, either from breeding aviaries or from the wild, and were then hand-raised in Andechs, Germany (48° N, 11° E). These birds had hatched at various times of the breeding period in this multiple-brooded species (Helm 2009). All birds received daily fresh water and a custom-made food mixture including mealworms (Gwinner et al. 1995). They were generally weighed and checked for moult once per week. To obtain detailed information on postjuvenile moult (in US terminology, the first prebasic moult,