

Weather influences the beginning of spring migration of White storks (*Ciconia ciconia*) in Africa: several years of satellite telemetry

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Several authors suggested on the basis of circumstantial evidence that time of onset of spring migration in birds may be influenced by environmental and weather conditions in winter quarters (Marra et al., 1998; Cotton, 2003; Sokolov & Kosarev, 2003; Gordo et al., 2005). No direct evidence has been available for this hypothesis. To test it, it is suggested to use satellite telemetry data on White storks (Kaatz, 2004) that give direct information on the timing of onset of spring migratory movements in Africa. German researchers tagged a total of 66 storks. The exact date of beginning spring migration was available for 22 adult birds. In 1994, 1995, 1998–2002, the date of onset of spring migration did not differ significantly (median date 28 February). However, in 1997 migration started significantly later (median date 24 March, Mann-Whitney U-test, $p = 0.007$). We analysed weather situation in February which is the crucial period for beginning spring migration in this species. 1997 was characterized by extreme weather. The northern border of rain clouds was shifted far to the south as compared with typical years. Huge areas of North and Central Africa were cooler than usually, the mean monthly temperature was lower by two and in some areas by three °C. The period of domination of February lows in southern Sahel which is the main wintering area of white storks was 2-4 times shorter than average. All this suggests that late onset of spring migration in 1997 was due to dry and cool February in winter quarters. Two possible mechanisms of impact of weather situation in Africa on the onset of migration: (a) through food availability; (b) direct impact of adverse weather on migration.