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SHORT NOTES

# The turnover of White Storks *Ciconia ciconia* on nests during spring migration

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**Abstract.** It is widely accepted that the first White Storks to arrive at a nest remain there to breed. In contrast to this belief, the paper describes the replacement of at least three males and at least one female at one nest in SW Poland during the spring of 1994. The first pair occupied the nest for 5–8 days, the second pair for one day, and probably only the third pair remained at the nest to actually breed. Additional data on arrival patterns show that such replacements of non-breeding storks may occur much more frequently than was previously thought, especially in areas of intense migration. Consequently, the most common phenological observations (e.g. the arrival dates of the first and second White Storks) are not really useful for defining the timing of breeding. It is suggested that the beginning of nest occupancy should be defined by the beginning of the permanent stay of the second partner, and not just by the date of the birds' first appearance.

**Key words:** White Stork, *Ciconia ciconia*, birds, methods, migration, phenology

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Spring arrivals of migrant birds (first arrival dates *sensu* Sparks et al. 2001) are among the most common ornithophenological data collected, however the origin of the birds first noted at a nest can rarely be determined. Contrary to most European bird species, the White Stork provides this opportunity due to the type of its nest-sites and its conspicuous behaviour. It is also the only European migrant species with many first arrival dates recorded at the nest. Moreover, as a result of high fidelity to previous nest-sites (Schulz 1998) the first storks seen on a nest are usually treated as the breeding birds (Profus 1991, Kuźniak 1994). This is supported by a strong correlation of the arrival date and the date breeding begins (Tryjanowski et al. 2004), although this may be independent of the origin of the first birds. On the other hand, the short duration of nest occupation during this early period (frequent breaks), as well as a high intensity of Stork "battles" at this time indicate that nests are visited by birds of diverse origin, also non-breeders. Migrating birds may be attracted to "alien" nests and temporarily stop there, especially along migration routes. However, these suppositions are weakly supported by field data (Kuźniak 1994, Ptaszyk 1994), and, especially, the frequency of the appearance of non-breeders on nests is not especially known.

Sparks et al. (2001) pointed out the need to investigate the link between arrival date, nesting date and population performance. However, it is not clear which arrival measures to use to analyse these relationships. In the case of the White Stork, the value of the most popular measures (arrival dates of the first and second birds) is doubtful, if early-spring appearances of non-breeders occur at a significant percentage of nests (but see Ptaszyk et al. 2003). This may explain, for example, the lack of a relationship between the arrival of the second bird and the departure date of adults, as reported by Kosicki et al. (2004).

In this note, I describe the replacement of several individual White Storks at one nest during spring migration and discuss the possible consequences of such events for the interpretation of field data.

The observations were conducted in the spring of 1994 in the village of Sieniawka in Lower Silesia (SW Poland, 50°46'N, 16°46'E), in a nest

located in a dead lime tree. The area is predominantly agricultural, and has one of the lowest stork densities in Poland, with a mean of 3.5 pairs/100 $km^2$ in 1989–1997 (Wuczyński 1997). The median date of arrival of the local population between 1991–2003 was April 4 for the first partner of a pair (n = 232), and April 9 for the second partner (n = 186). 20% of the first arrival dates (FAD) occurred after April 15 (Author's unpubl. data).

In 1994, both partners appeared at the nest simultaneously on April 15. The male HIDDENSEE B 6681 was ringed as a nestling in 1990 in Germany, 236 km WNW from Sieniawka. On the following days, both birds collected nest material, frequently copulated, but the location of the nest did not allow me to check if laying commenced (despite regular controls over the entire breeding season, eggshells were not found in the proximity of the nest). Between April 21 and 23, the birds were predominantly absent from the nest, although at least one stork spent the night there. On April 24, another male occupied the nest (HIDDENSEE 222377, similarly ringed as a nestling in Germany in 1987, 422 km NW from Sieniawka) together with one non-ringed female. Several fights with two other White Storks were observed on this day with the new male acting as the defender, but the moment when the previous male disappeared was not determined. Although the new pair of storks frequently copulated, they abandoned the nest that same day. The last recognizable stork exchange was recorded on April 27, a pair of non-ringed birds appeared and from this moment the nest was occupied without interruption. Again, the birds collected nest material, copulated, and sat on the nest during the day. However, what was observed was not a typical, continuous incubation behaviour. The pair was not successful and left the nest about June 10. From that day, the nest was visited only sporadically. The lack of rings on the observed female or females made it impossible to determine her/their origin.

This description provides evidence of a weakly documented phenomenon — temporary nest occupation by non-breeding adult White Storks in the spring. Breeding attempts of the ringed males can not be excluded, although the probability of this is not very high, at least in case of the second male. Alternatively, the nest in Sieniawka may have served as a stopover site, with only the third male settling permanently. This possibility is supported by the short duration of nest occupation, and by the places of birth of the ringed males — to the northwest of the observation site, which is consistent with the spring migration route of the eastern White Stork population (Berthold et al. 2002). White Storks exhibit a strong fidelity to their region of birth (Schulz 1998) and the majority of birds select breeding sites at a distance of c. 50 km from their place of birth. Unfortunately, other recovery data for the observed birds do not exist, especially, nothing is known of their breeding attempts (information from the Bird Ringing Centres in Hiddensee and Gdańsk).

Available anecdotal examples of the exchange of White Storks on a nest are generally provided in the context of social relations between both partners (Creutz 1985). Hence, the frequency of nests occupancy by non-breeders in spring remains unknown. In view of the paucity of ringing data, the frequency of this phenomenon can be determined by the distribution of the duration of nest occupancy. A short-term stay of one or two birds at a nest, sometimes for as little as a few minutes, followed by the absence of storks for many days, may indicate that these birds were non-breeders (Ptaszyk 1994). The nest in Sieniawka (the only site where observations of the arrival pattern were carried out with enough precision) was established in 1992, and occupied by breeding pairs over seven seasons to 2004. The FAD was equivalent to permanent nest occupation in three seasons, but long breaks between the first arrival and permanent stay were recorded in four seasons (12 days in the 1994 season described, then 21, 27 and 9 days). Therefore, more than half of the FAD's would apply to non-breeders. Numerous similar, but random, data can be derived from the annual survey conducted in this area since 1989 (A. Wuczyński – unpubl. data). Consequently, replacements may occur muchmore frequently in the population than previously thought, especially in areas of intense migration.

The arrival date influences the date of breeding and breeding success (Tryjanowski et al. 2004). When studying these relationships, ascertaining the correct arrival date is important, e.g. first, second, third or median arrival date (Ptaszyk et al. 2003). It is frequently assumed that the arrival of the second partner (usually female, Creutz 1985) determines the date of permanent nest occupation in the White Stork (Kosicki et al. 2004). This date then allows the establishment of the approximate time of breeding. However, this method seems to be an oversimplification, justified only by the ease

of collecting large amounts of data (e.g. by survey questionnaires) and does not necessarily reflect biological reality. In regions where stork replacement in the spring is the rule rather than the exception, the date of a second bird's arrival may be misleading (the second bird may be a non-breeding male, or two birds arriving simultaneously may in fact be migrants). The determination of a more precise start of nest occupancy is required in phenological studies of the White Stork. This date should be fixed by the beginning of the permanent stay of the second partner (see a similar suggestion in Ptaszyk 1994). Earlier, temporary appearances of second birds at the nest should not be considered, and as a result, periods following when the nest is *de facto* empty would not be included as part of the breeding season of a particular site. Although traditional methods of collecting phenological data on the White Stork should be continued (to enable the comparison of current data with those collected in previous seasons), the new approach suggested in this paper should also be used.

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## STRESZCZENIE

**[Wymiana nielęgowych bocianów białych na gniazdach w okresie migracji wiosennej]**

Powszechnie przyjmuje się, że pierwsze pojawiające się wiosną na gniazdach bociany białe to ptaki przystępujące do lęgu w danym gnieździe. W doniesieniu zweryfikowano ten pogląd w oparciu o obserwacje dokonane w 1994 roku na gnieździe w Sieniawce na Dolnym Śląsku oraz wieloletnie dane z Przedgórza Sudeckiego. W kwietniu 1994 gniazdo to było zasiedlane kolejno przez co najmniej 3 samce — w tym dwa pierwsze, dorosłe, obrączkowane i być może przelotne — w parach z nie obrączkowanymi samicami (samicą?). Pierwsza para zajmowała gniazdo przez 5–8 dni, druga — 1 dzień, i prawdopodobnie dopiero trzecia zasiedliła gniazdo na stałe. Lęg nie zakończył się sukcesem. Krótkotrwałość zasiedlenia gniazda oraz miejsca pochodzenia dwóch pierwszych samców (odpowiednio 236 i 422 km na północny zachód od Sieniawki) wskazują, że były to raczej ptaki w trakcie przelotu, zasiedlające gniazdo tylko chwilowo. Przytoczono dalsze argumenty świadczące o tym, że pierwsze pojawy bocianów na gniazdach dotyczą ptaków nielęgowych prawdopodobnie znacznie częściej niż dotychczas przypuszczano, szczególnie na obszarach położonych na trasie ich wiosennej wędrówki. Potwierdzenie tego przypuszczenia oznaczałoby, że charakteryzowanie początku lęgów bociana na podstawie najczęściej gromadzonych danych fenologicznych (przylot pierwszego i drugiego partnera) może być obarczone dużym błędem. Pożądane jest zwłaszcza precyzyjniejsze określenie terminu zajęcia gniazda. W doniesieniu zaproponowano, aby wyznaczał go początek okresu stałego przebywania na gnieździe drugiego osobnika z pary, a nie tylko data jego pierwszego pojawu. Takie podejście wymaga poszerzenia dotychczasowych metod gromadzenia danych ornitofenologicznych.