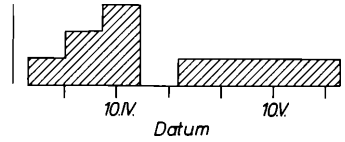
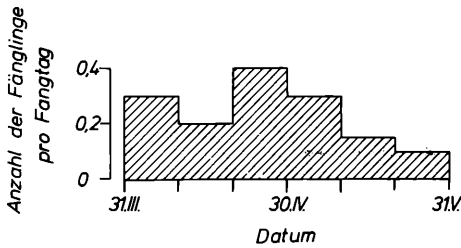
*S. atricapilla*, Frühjahr, Helgoland*S. atricapilla*, Frühjahr, Eilat (Israel)*S. atricapilla*, Frühjahr, Ismaning

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Effects of Drought on the White Stork in Natal, South Africa

By Gordon L. Maclean, Robert M. Gous & Theodore Bosman

During the latter half of December 1972, reports were received from farmers and travellers near Pietermaritzburg (29.36 S 30.23 E), Natal, and near Kokstad (30.32 S 29.28 E), East Griqualand, Rep. of South Africa, that White Storks *Ciconia ciconia* were being found dead or dying in these areas. A dead stork found near Kokstad is said to have been marked by a Helgolander. Details are: the bird has been ringed as nestling the 25 June 1972 at Wahrenholz, Kr. Gifhorn, Niedersachsen, F. R. Germany 53.37 N 10.36 E by Mr. W. Paszkowski. The general condition of all the storks was reported to be poor — plumage was dirty and the birds were weak and debilitated. Unfortunately no counts of the ailing birds was made. Assuming the possibility of pesticide poisoning, we asked the Natal Parks, Game and Fish Preservation Board to obtain a stork for us in order to investigate the bird's condition in detail.

On 29 December a White Stork was caught by hand near Pietermaritzburg; the bird was weak, had no fat reserves at all, and its plumage was stained with earth. The bird was killed and dissected. It was found to be heavily infested with a tapeworm of the genus *Hymenolepis* which greatly distended the jejunum. To all appearances it is not a question of *H. microcephala* Rud. but probably of *H. multi-*

formis Creplin (with obviously several records in Africa s. f. SZIDAT 1940). The bird's crop was empty except for three beetle elytra.

To test for pesticides, 10 g of liver tissue was homogenized in acetone overnight at -10°C to remove most lipids. Sample deposits were coated internally onto 15 mm diameter test tubes to a height of about 50 mm, using 0,5 cc of acetone solution per tube. Five replicates were tested against an acetone blank and DDT controls (0,001 mg p,pDDT/10 ccm). After the solvent had evaporated, five randomly selected adult *Drosophila* were introduced into each tube as test insects; they were kept in contact with the deposits by inverting the tubes toward the light. No mortality attributable to the presence of toxic residues occurred in any of the tubes containing tissue extract or acetone blanks. Symptoms typical of organochloride poisoning occurred in all the DDT controls. There was therefore no evidence of the presence of unmetabolized DDT in the White Stork tissue sampled.

Locality	Period	Months				Total
		Sept.	Oct.	Nov.	Dec.	
Ukulinga 29.40 S 30.21 E	11 years ended 1960	36,6 (6)	63,3 (13)	80,8 (14)	116,6 (17)	297,3 (50)
Darvill 29.36 S 30.26 E	11 years ended 1960	48,3 (9)	95,6 (15)	114,5 (18)	167,7 (22)	426,1 (64)
Cedara 29.33 S 30.16 E	50 years ended 1960	44,2 (10)	81,6 (16)	111,6 (18)	128,8 (21)	366,2 (65)
University 29.37 S 30.24 E	1971	28,9 (12)	109,2 (15)	65,5 (14)	86,5 (17)	290,1 (58)
University	1972	11,5 (4)	55,6 (9)	73,9 (10)	41,5 (11)	182,5 (34)

Table 1: Rainfall in mm and rain-days (in brackets below rainfall figures) for Pietermaritzburg localities; the University lies between Darvill and Ukulinga and has a rainfall approximately intermediate between those of these two localities. Data for Ukulinga, Darvill and Cedara are means from the Weather Bureau, Republic of South Africa, 1965. Data for University were kindly provided by the Department of Botany, University of Natal.

The debilitated condition of this stork was therefore due to starvation aggravated by a heavy infestation of gut parasites. An analysis of rainfall figures for the Pietermaritzburg area for the period September to December is given in Table 1, from which it can be seen that this period in 1972 was comparatively low. No rain fell between 22 December 1972 and 2 January 1973. The average rainfall for Sept.–Dec. for the University of Natal campus, taken as the mean between the figures for Ukulinga and Darvill for the 11-year period ended in 1960, was calculated to be 361,7 mm per year. During the corresponding period in 1971 about 80 % (290,1 mm) of the average fell, while in 1972 only 50 % (182,5 mm) of the average fell, accompanied by a hot rainless period at the end of December.

The first good rain after this drought was a fall of 81,8 mm on 6 January 1973. A visit on 8 January to Otto's Bluff, (29.26 S 30.21 E), about 30 km from Pietermaritzburg where debilitated White Storks had been seen in the previous few weeks, showed that all of the roughly 100 storks seen had fully recovered and were feeding actively behind a plough; this raises the further possibility that the stork's food supply had

been reduced not only directly by drought conditions, but also indirectly by the suspension of ploughing operations during the dry period. As soon as good rains had fallen, ploughing was resumed and the White Storks immediately capitalized on the situation as a new food source. No further White Stork casualties were reported after 6 January 1973.

Considerable numbers of White Storks are overwintering in Natal and East Griqualand this year, and to date (29 June 1973) small groups and flocks of up to 17 birds can still be seen in scattered localities.*

We wish to thank the staff of the Natal Parks, Game and Fish Preservation Board, and of the „Natal Witness“ (especially Mr RICHARD PARIS), and of the Department of Botany at the University of Natal for their kind assistance. Our thanks go also to Mr. A. VERSTER of the Veterinary Research Institute, Onderstepoort, for helping in the identification of the cestode material.

Zusammenfassung

Wirkungen der Trockenheit auf Weißstörche in Natal, Südafrika

Ein auffälliges Sterben und Dahinsiechen zahlreicher Weißstörche (*Ciconia ciconia*) bei Pietermaritzburg und Kokstad während der zweiten Dezemberhälfte 1972 fand seine Erklärung im Verhungern infolge einer extremen Trockenheit (Regenhöhen werden angegeben). Bei einem kranken, dann getöteten Weißstorch wurden Rückstände von chlorierten Kohlenwasserstoffen in der Leber nicht gefunden. Dagegen konnte ein starker Befall des Bandwurmes *Hymenolepis* (vermutlich *H. multiformis* Creplin) festgestellt werden. Als Folge des durch die genannte Dürre verursachten schlechten Ernährungszustandes sind offenbar beträchtliche Mengen von Weißstörchen zum Südwinter nicht abgezogen, sondern in Südafrika geblieben.

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* Herausgeberanmerkungen T. B. OATLEY (et al.), Natal Bird Club News Sheet 219, Juli 1973, Overwintering White Storks, bringen entsprechende Angaben: Im (südlichen) Sommer 1972/73 seien allgemein in Natal mehr Störche angekommen und dageblieben als sonst; angeführt sind 12 Orte. Unweit Pietermaritzburg war in der 3. Juliwoche 1973 noch ein Flug von gut 200 Störchen. Die Vögel waren auffallend zahm, lebend untersuchte außergewöhnlich mager; bei toten Stücken wurde Magen-Ulcus nachgewiesen. Kollabierte Störche ließen sich zwar wieder aufpäppeln, nahmen aber nicht an Gewicht zu. Sollte Gift im Spiel sein, so sei dies sicher nicht in Natal aufgenommen worden.

Diese Darlegungen tragen zur Erklärung der auffallend schwachen und oftmals späten Rückkehr von Weißstörchen in Mitteleuropa im Frühjahr 1973 bei.

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